

Hydroids (Cnidaria: Hydrozoa: Leptolida) from Moreton Bay, Queensland, and adjacent regions: a preliminary survey

Myriam PREKER

Ian D. LAWN

321 Pullenvale Road, Pullenvale, Queensland 4069, Australia. Email: mpreker@myway.com

Citation: Preker, M. & Lawn, I.D. 2010 12 30. Hydroids (Cnidaria: Hydrozoa: Leptolida) from Moreton Bay, Queensland, and adjacent regions: a preliminary survey. In, Davie, P.J.F. & Phillips, J.A. (Eds), Proceedings of the Thirteenth International Marine Biological Workshop, The Marine Fauna and Flora of Moreton Bay, Queensland. *Memoirs of the Queensland Museum – Nature* 54(3): 109-149. Brisbane. ISSN 0079-8835.

ABSTRACT

A preliminary survey of the hydroid fauna of Moreton Bay and adjacent regions, was undertaken. Forty-four species of hydroids from 14 families were identified. Some species identifications remain tentative due to lack of reproductive material, which is essential for accurate diagnoses. Thirteen species are new records to southeast Queensland and one, *Hincksella cylindrica pusilla* (Ritchie, 1910b), is new to Australia. This brings the list of the hydroid fauna for the region to 74 species in 18 families. Twenty-five species (57%) of our collection had tropical or subtropical distributions, with only two (5%), *Opercularella humilis* (Bale, 1924) and *Hincksella cylindrica* (Bale, 1888), having predominantly temperate distributions. □ Cnidaria, Hydrozoa, hydroids, southwest Pacific, Australia, Queensland, intertidal, subtidal, reef, taxonomy.

This paper is a preliminary report on the hydroids collected during The Thirteenth International Marine Biological Workshop held at the Moreton Bay Research Station from 7–25 February, 2005. Collections were made by the authors from intertidal and shallow-water habitats in Moreton Bay, Queensland, and from adjacent regions, mainly the reefs situated in the Coral Sea due north of North Stradbroke Island.

Moreton Bay is one of the largest, shallow-estuarine bays in Australia. Its sub-tropical location supports a fauna that incorporates a wide range of both temperate and tropical species (Davie & Hooper 1994). Furthermore, the diversity of environments within the bay favours the co-occurrence of a wide variety of estuarine and oceanic species. The hydroid fauna collected during the workshop was no exception. Most species, however, were small and cryptic, apart from the few, visually-dominant species that occur on exposed reef surfaces, such as: *Macrorhynchia philippina*, *Idiellana pristis*, *Sertularella diaphana*, *Pennaria disticha* and *Solanderia secunda*.

Most of our current knowledge of the hydroid fauna of Moreton Bay and the southern Queensland coast comes from Pennycuik's (1959) studies covering the area between Caloundra Heads and the New South Wales border (latitudes 22°–26°S). Pennycuik reported 44 species (based on current synonymies). Subsequently, Preker (1998) reported 10 species (5 additional to Pennycuik's list), and Watson (2002) recorded 15 species (11 additional), giving a total of 60 species for SE Queensland. With the present work, we now recognise 74 species in 18 families, and the total is sure to continue to rise with more extensive field collecting.

MATERIAL AND METHODS

COLLECTION METHODS, SITES AND HABITATS

Specimens were collected by hand from intertidal areas during low tides, snorkelling in shallow-waters, SCUBA diving to depths of up to 30 m, and by grab-samples from deeper waters. Collection sites, depths, and brief descriptions of habitats are shown in Table 1.

Table 1. Locations in Moreton Bay and adjacent regions where hydroids were collected during the workshop.

Locality	Coordinates	Depth (m)	Substrate
Dunwich	27°29'28.98"S, 153°23'44.46"E	3	Sandy mud and seagrass.
Myora	27°28'06.73"S, 153°25'18.44"E	3–5	Mud and seagrass.
Amity Point	27°24'13.71"S, 153°26'11.31"E	3–12	Sand, rocks and breakwater.
Cylinder Beach	27°25'26.16"S, 153°32'05.61"E	3	Rocky headland.
Frenchmans Bay	27°25'30.28"S, 153°32'35.66"E	3	Rocky headlands and tide pools.
Shag Rock	27°24'47.92"S, 153°31'35"E	18–25	Rocky bottom, sand and coral.
Flat Rock	27°23'27"S, 153°33'12.7"E	15–25	Rocky bottom, algae and good coral growths.
Shark Gutter	27°23'30.23"S, 153°33'5.68"E	20–30	Rocky bottom, sand and coral.

EXAMINATION OF MATERIAL

Most of the collected material was placed in 70% ethanol in the field or immediately upon return to the laboratory. Descriptions, therefore, were primarily based on preserved material, which meant that information such as pigmentation, descriptions of the living hydranths, and the ability to discharge the nematocysts in order to observe them, was lost by not studying the material while it was still alive. On the other hand, the time that would have been required to sort through and examine all the material before it was preserved would have resulted in significant deterioration in the quality of voucher material.

Colonies were examined using a dissection stereomicroscope, and nematocysts were observed with a Nomarski Interference Contrast microscope. The nematocysts were separated from the epithelia by compressing pieces of the preserved tissue between slide and coverslip. Categories of nematocysts were identified according to the classification of Weill (1934).

Tragically much of the voucher collection was lost before it could be deposited at the Queensland Museum. This was the result of a violent storm that brought down a tree seriously damaging the home-based laboratory where the collection was under study.

PRESENTATION

We largely adhere to the classification of Cornelius (1995a, 1995b), while the arrangement of the families follows Bouillon *et al.* (2004). Within the families, the genera and species are listed alphabetically and do not imply a phylogeny.

TAXONOMY

Order ANTHOATHECATAE Cornelius, 1995a

Suborder FILIFERA Kühn, 1913

Family EUDENDRIIDAE L. Agassiz, 1862

Eudendrium Ehrenberg, 1834

Eudendrium pennycuikae Watson, 1985

Eudendrium pennycuikae Watson, 1985: 183–185, figs 5–8.

Eudendrium album — Pennycuik, 1959: 167 [not *Eudendrium album* Nutting, 1896]

Eudendrium cf. pennycuikae — Russell & Hewitt, 2000: 87.

Description. Small hydroid colonies with erect stems arising from a tubular hydrorhiza attached to seagrass. The stems reach 9 mm in height and are sparingly and irregularly branched. The perisarc is smooth, for the most part, but annulated at the base, at the origin of each branch and at other irregular intervals throughout the length of the stem. Hydranth small, surrounded by 18–20 tentacles and has a large hypostome. Female gonophores are immature and borne below the hydranth. Only one type of nematocyst present: small microbasic euryteles in the tentacles and in the body of the hydranth. Only a few were discharged.

Measurements. Stem: height 9 mm, diameter 78 µm. Pedicel diameter 60–75 µm. Hydranth length 230–395 µm. Female gonophore diameter 145–185 µm.

Remarks. The family Eudendriidae is diagnostically troublesome, and distinguishing between species is difficult as the colony morphology and reproductive structures are similar in many

of them. The features of the cnidome provide the best guide for identification of species, especially when considered along with reproductive structures. The *Endendrium* from Amity Point compares very closely with Pennycuik's (1959) *Endendrium album* Nutting, 1896 from Bundaberg. Her description, however, does not include the nematocysts. Watson (1985) compared Pennycuik's specimen with a specimen of *E. album* and, owing to differences in the cnidome, described the Queensland material as a new species, *Endendrium pennycuikae* Watson (1985).

Occurrence. Amity Point.

Distribution. Queensland (Bundaberg, Amity Point).

Suborder CAPITATA Kühn, 1913

Family PENNARIIDAE McCrady, 1859

Pennaria Goldfuss, 1820

Pennaria disticha Goldfuss, 1820

(Fig. 1A)

Pennaria disticha Goldfuss, 1820: 89; Brinckmann-Voss, 1970: 40, text-figs 43, 45–50; Gibbons & Ryland, 1989: 387, fig. 5; Migotto, 1996: 25; Schuchert, 1996: 142–143, fig. 85a–c; Watson, 1999: 16–18, fig. 10A–I; Preker, 2001: 154; Kirkendale & Calder, 2003: 165–166; Schuchert, 2003: 148, fig. 8A–B; Preker, 2005: 46; Preker & Lawn, 2005: 340.

Halocordyle disticha — Millard, 1975: 41–42, fig. 16C–G; Calder, 1988: 56–60, figs 43a, b, 44a, b, 45a–h (cum syn.); Hirohito, 1988: 28–30, fig. 9a–d, pl. 1 fig. C.

Halocordyle disticha var. *australis* Stechow, 1925: 194–195; Pennycuik, 1959: 160, 161–162, pl. 1 figs 3–7.

Pennaria australis — Bale, 1884: 45–46; Trebilcock, 1928: 2; Ralph, 1953: 70, figs 14, 14A.

Material Examined. QM-G331147, Amity, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Conspicuous, erect, racemose hydroid colonies with terminal hydranths and pinnately-branched stems, reaching 320 mm maximum height. Growth monopodial, main stem divided into internodes of varying length. Each internode annulated proximally and bearing alternate distal hydrocladia. Longest hydrocladia occur at approx. middle of stem. Hydrocladia divided by straight nodes into internodes, each bearing a distal ramule on its upper surface; ramules annulated for most of their length.

Hydranths are borne at end of stem, hydrocladia and ramules. Hydranths clavate with a

whorl of 10–12 filiform aboral tentacles and 14–18 short irregularly-scattered capitate tentacles. Hyperstome dome shaped.

Gonophores borne between the sets of tentacles on short stems are degenerate, pear-shaped medusae, with four radial canals and four rudimentary marginal tentacles.

Colour. The stem is a shining dark brown, hydrocladia light brown and the hydranths milky white in the preserved colonies.

Remarks. A well-known species; the material examined fits the description given by Gibbons & Ryland (1989) and Watson (1999).

Occurrence. Amity Point, Cylinder Beach, Flat Rock.

Distribution. Circumglobal in tropical to warm-temperate waters.

Family SOLANDERIIDAE Marshall, 1892

Solanderia Duchassaing & Michelin, 1846

Solanderia secunda (Inaba, 1892)

Dendrocoryne secunda Inaba, 1892: 98; Stechow, 1909b: 40–42, pl. 2, figs 1, 2; Stechow, 1913: 7.

Solanderia secunda — Vervoort, 1962: 526–531, figs 6–9; Vervoort, 1966: 387, 389, fig. 8; Bouillon *et al.*, 1992: 12–14, pl. 5 figs 1–4, pl. 6 figs 1–4, pl. 10 figs 1–4, pl. 11 figs 1–4, pl. 12 figs 1–5, pl. 13 figs 1–4, pl. 14 figs 1–5; Watson, 1999: 13–16, fig. 9A–F; Schuchert, 2003: 149, fig. 8; Kirkendale & Calder, 2003: 164–165; Preker & Lawn, 2005: 340.

Material Examined. QM-G331152, Flat Rock, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Large, prominent, fan-shaped colonies reaching 10 cm height. Main stem thick and flattened in sections. Branches arise irregularly, expanding mainly in one plane and thin towards growing tips. Colonies attach to rocks by means of flattened mass of fibres and are supported by internal skeleton consisting of an anastomosing network of chitinous trabeculae. Longitudinal fibres of this skeleton are slightly raised and look rib-like, even in living material. Longitudinal fibres connected by thinner, transverse fibres. Hydrophores not well developed; consist only of pair of small, distinct spines at base of some polyps. Not all hydranths are flanked by such spines and, in some cases, they occur only on one side of hydranth. Hydranths are numerous on terminal branches, less numerous on thicker branches, and very scarce on

main branches. Preserved polyps 450–540 µm long, slightly ovoid in structure with greatest diameter ranging from 190–245 µm. Zooid bearing 12–15 capitate tentacles, four arranged in an oral whorl, rest scattered over body.

No gonophores were observed.

Colour. Preserved colonies have maroon-brown stem that gradually merges into a yellowish-brown colour in the finer ramifications. The coenosarc and polyps are creamy white.

Remarks. The present material conforms with the description of *S. secunda* given by Bouillon *et al.* (1992). Apart from the presence of fewer prominent spines on the side of the polyps, the microscopic structure of the skeleton fits with the description given. The difference in spine development, however, is of some importance. Vervoort (1962) states that, aside from the presence of thorns, there are scarcely any other differences in skeletal structure between *Solanderia gracilis* Duchassaing & Michelin, 1864 and *S. secunda*. Bouillon *et al.* (1992) reduced the number of valid species of *Solanderia* from 13 to 6. The resulting valid species, therefore, encompass specimens with a great morphological variation and from a wide geographical area. This may account for the differences in spine development seen in the Moreton Bay material compared with the description given by Bouillon *et al.* (1992). *Solanderia secunda* distribution ranges from tropical and subtropical regions of the Pacific and Indian Oceans (Bouillon *et al.* 1992) whereas *S. gracilis* occurs only in the West Indies (Vervoort 1962). Pennycuik's (1959) specimens of *Solanderia fusca* (Gray, 1868) from Heron Island is very likely also *S. secunda*. Wineera (1968) found the skeleton of Queensland material to be very similar to that of *S. secunda*.

Occurrence. Flat Rock, Shark Gutter.

Distribution. Tropical and subtropical Pacific, Red Sea, Indian Ocean.

Family TUBULARIIDAE Fleming, 1828

Ectopleura L. Agassiz, 1862

Ectopleura crocea (L. Agassiz, 1862)

Tubularia crocea L. Agassiz, 1862: 249, pls. 23–23a; Allman, 1872: 416–417; Torrey, 1902: 43–46, pl. 3, figs 22–23; Pennycuik, 1959: 147; Brinckmann-Voss, 1970: 28, figs 30–34; Millard, 1975: 38.

Ectopleura crocea — Petersen, 1990: 174–175, fig. 27A–C; Schuchert, 1996: 107–109, fig. 64a–g.

Description. Colony consisting of unbranched tubulariid hydroids arising from stolon attached to old, decaying wood. Height to 38 mm. Hydranths vasiform, bearing two whorls of tentacles. Oral tentacles short, filiform, numbering 18–20; aboral tentacles longer, filiform, numbering 21–23. Stem covered with firm, brown, slightly-wavy perisarc that thins distally to become wrinkled, transparent sheath terminating below hydranth. Perisarc has a few, scattered, irregular annulations or corrugations. Gastroderm of caulus with two longitudinal ridges, expanding distally to form distinct, dilated, spherical neck region.

Gonophores spherical, borne in clusters on short stems on unbranched blastostyles just above aboral tentacles. Gonophores without radial canals, female gonophores with lateral processes around opening.

Remarks. Petersen (1990) remarks that *Ectopleura crocea* has been thoroughly confused with *E. larynx*. The main feature distinguishing them appears to be the distal processes on the older female gonophores.

Occurrence. Scott's Point, Amity Point.

Distribution. Pacific and Atlantic coasts of USA, Europe, Mediterranean, Japan, New Zealand, Queensland (Moreton Bay).

Order LEPTOTHECATAE Cornelius, 1995a

Suborder CONICA Broch, 1910

Family AGLAOPHENIIDAE L. Agassiz, 1862

Macrorhynchia Kirchenpauer, 1872

Macrorhynchia philippina (Kirchenpauer, 1872)

Aglaophenia (*Macrorhynchia*) *Philippina* Kirchenpauer, 1872: 29, 45–46, pl. 1 fig. 26, pl. 2 fig. 26a, b, pl. 7 fig. 26.

Aglaophenia ureus — Bale, 1884: 155–156, pl. 14 fig. 6, pl. 17 fig. 9.

Lytocarpus Phillippinus — Bale, 1888: 786–789, pl. 21 figs 5–7.

Lytocarpus philippinus — Kirkpatrick, 1890: 604; Billard, 1913: 78–79, fig. 63; Briggs & Gardner, 1931: 193–194, text-fig. 4; Pennycuik, 1959: 186; Millard, 1975: 449–451, fig. 138A–C.

Lytocarpia philippina — Stechow, 1919: 132–124, fig. Z.

Macrorhynchia philippina — [Not Rees & Vervoort, 1987: 177–180, fig. 3 (cum syn.)]; Ryland & Gibbons, 1991: 553–555, fig. 22A–D; Watson, 1996: 79; Migotto, 1996: 40–43, figs 8e–f; Calder, 1997: 66–69, fig. 21a–b; Watson, 1997: 538–539, fig. 8F; Preker, 1998: 172; Watson, 2000: 67–68, fig. 53A–D; Preker, 2001: 155; Watson, 2002: 349, fig. 7A, B; Schuchert, 2003: 221–223, fig. 67A–E; Kirkendale & Calder, 2003: 171; Vervoort & Watson, 2003: 336–337, fig. 81D; Preker & Lawn, 2005: 344.

Material Examined. QM-G331146, Shag Rock, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Colonies erect, plumose, branched; variable sizes to 100 mm, main stem polysiphonic. Branches arising irregularly from peripheral tubes of stem, most polysiphonic. Main axial tube of stem and branches divided into internodes. Basal branch internode long and without hydrocladia but with mesial nematothecae and terminating in oblique hinge joint. Thereafter, all internodes with one antero-lateral apophysis and two nematothecae, one inferior anterior and one axillary anterior. Small mamelon present on anterior surface of apophysis.

Hydrocladia divided into regular, thecate internodes by indistinct transverse nodes. Hydrocladial internodes with two internodal septae; one near the basal constriction of hydrotheca, the other at the base of the lateral nematothecae.

Hydrothecae deep, sack shaped, widening to margin, curving abruptly outward distally. Prominent abcauline intrathecal septum reaching about half-way into hydrotheca and a small adcauline intrathecal septum or peg above the hypopore. Margin with two, rounded, lateral cusps and a median abcauline tooth.

Cauline nematothecae broad based, conical, with circular orifice on a short neck. Cauline nematothecae at branch bases bifurcate. Median inferior nematotheca tubular, adnate to abcauline hydrothecal wall for about one-half the cup height, then free and diverted upwards, reaching beyond the hydrothecal margin. It possesses three apertures: one terminal, one on the upper surface, where it becomes free, and one leading into the hydrothecal cavity. Lateral nematotheca tubular, inclined laterad and antero-distal, overtopping hydrothecal margin, with two apertures: one terminal and one mesial.

Gonothecae large, lenticular, protected by modified hydrocladia (phylactocarps) given off from front of branch.

Colour. Stem very dark brown to black, hydrocladia cream.

Measurements. Hydrocladium: internode length 256–300 µm, diameter at node 70–92 µm. Hydrotheca: adcauline length 244–264 µm, adnate abcauline length 124–150 µm, free abcauline length 56–64 µm, aperture 100–120 µm. Nematothecae: median inferior: total length 240–264 µm, adnate length 168–200 µm, free length 68–80 µm; lateral: total length 144–160 µm, width at base 44–60 µm. Gonotheca: length 998–1,210 µm.

Remarks. A well-known species, distinguished from other similar species by its well-marked, abcauline ridge projecting into the hydrotheca, and its distinctive colouration. *Macrorhynchia philippina* has a painful sting if touched.

Occurrence. Polka Point, Dunwich, Myora (coral patch), Amity Point (pools), Cylinder Beach (rocky pools), Shag Rock, Flat Rock, Shark Gutter.

Distribution. Pantropical.

Macrorhynchia phoenicea (Busk, 1852) (Fig. 1C)

Plumularia phoenicea Busk, 1852: 398–399.

Aglaophenia phoenicea — Bale, 1884: 159–161, pl. 15 fig. 1–5, pl. 17 fig. 1–4, pl. 19 fig. 31.

Lytocarpus phoeniceus — Kirkpatrick, 1890: 604; Stechow, 1909b: 97–98; Billard, 1913: 74–76, figs 60–61; Jäderholm, 1916: 7, fig. 4; Briggs, 1918: 47; Jäderholm, 1919: 25; Jarvis, 1922: 354; Jäderholm, 1923: 5; Briggs & Gardner, 1931: 194–195, text-fig. 5; Stephenson *et al.*, 1931: 67; Pennycuik, 1959: 187; Millard, 1975: 451–453, fig. 137D.

Macrorhynchia phoenicea — Stechow, 1923a: 19; 1923b: 241; 1925: 259–260; Mammen, 1965b: 313–314, figs 108–109; Hirohito, 1969: 26; Ryland & Gibbons, 1991: 555–557, fig. 23A–E; Hirohito, 1995: 299, fig. 106a–c; Preker, 1998: 172; Watson, 2000: 68–70, fig. 54A–F; Kirkendale & Calder, 2003: 171; Schuchert, 2003: 223–226, figs 68A–F, 69A–C; Vervoort & Watson, 2003: 337; Preker & Lawn, 2005: 344.

Description. Colonies erect, branched in one plane forming a fan, up to 34 mm, stem polysiphonic. Branches arising from peripheral tubes of stem, mostly polysiphonic. Main axial tube of stem and branches divided into internodes by oblique nodes. Basal stem and branch internodes athecate and without hydrocladial apophyses but with one medial nematotheca. Distal internodes with one antero-

lateral hydrocladial apophysis, one inferior anterior and one axillary anterior nematotheca and a mamelon on the anterior surface of the apophysis.

Hydrocladia divided into regular thecate internodes by slightly-oblique nodes and with three internodal septae: one near the basal constriction of the hydrotheca, one at the base of the lateral nematotheca and a small one mid-way between the two.

Hydrotheca sack shaped, widening to margin, adnate to hydrocladial internode then curving abruptly outward distally and with a thin abcauline intrathecal septum reaching into the hydrotheca. Margin turned away from internode, forming an angle of 30°–35°, with five marginal cusps: a small pair near the base of the lateral nematothecae, a low, broad pair mid-laterally, and a single small adcauline cusp; no adcauline tooth.

Cauline nematothecae conical with circular orifice on short neck and small, mesial aperture. Median inferior nematotheca tapering, tubular, reaching beyond hydrothecal margin, directed out and distal, with two apertures: one terminal, one on upper surface, where it becomes free from hydrotheca. Lateral nematothecae tubular, long, directed latero-distal and with a terminal aperture posterad and one mesial.

Gonothecae not seen.

Colour. Brown.

Measurements. Hydrocladium: internode length 256–296 µm, diameter at node 72–90 µm. Hydrotheca: adcauline length 189–220 µm, adnate abcauline length 98–114 µm, free abcauline length 20–28 µm, aperture 136–152 µm. Nematothecae: median inferior: 100–150 µm; lateral: 60–77 µm.

Remarks. *Macrorhynchia phoenicea* is easy to recognise by its bristly appearance, fan-shaped colony coloured uniformly-brown, and dense hydrocladia of a homogenous length.

Occurrence. Polka Point, Amity Point, Dunwich, Cylinder Beach (rocky pools) and Flat Rock.

Distribution. Tropical Indian Ocean, Indonesia, Japan, Australia (Torres Strait, Darwin Harbour, Gulf of Carpentaria, Moreton Bay).

Family CAMPANULINIDAE Hincks, 1868

Lafoeina G.O. Sars, 1874

Lafoeina amirantensis (Millard & Bouillon, 1973)

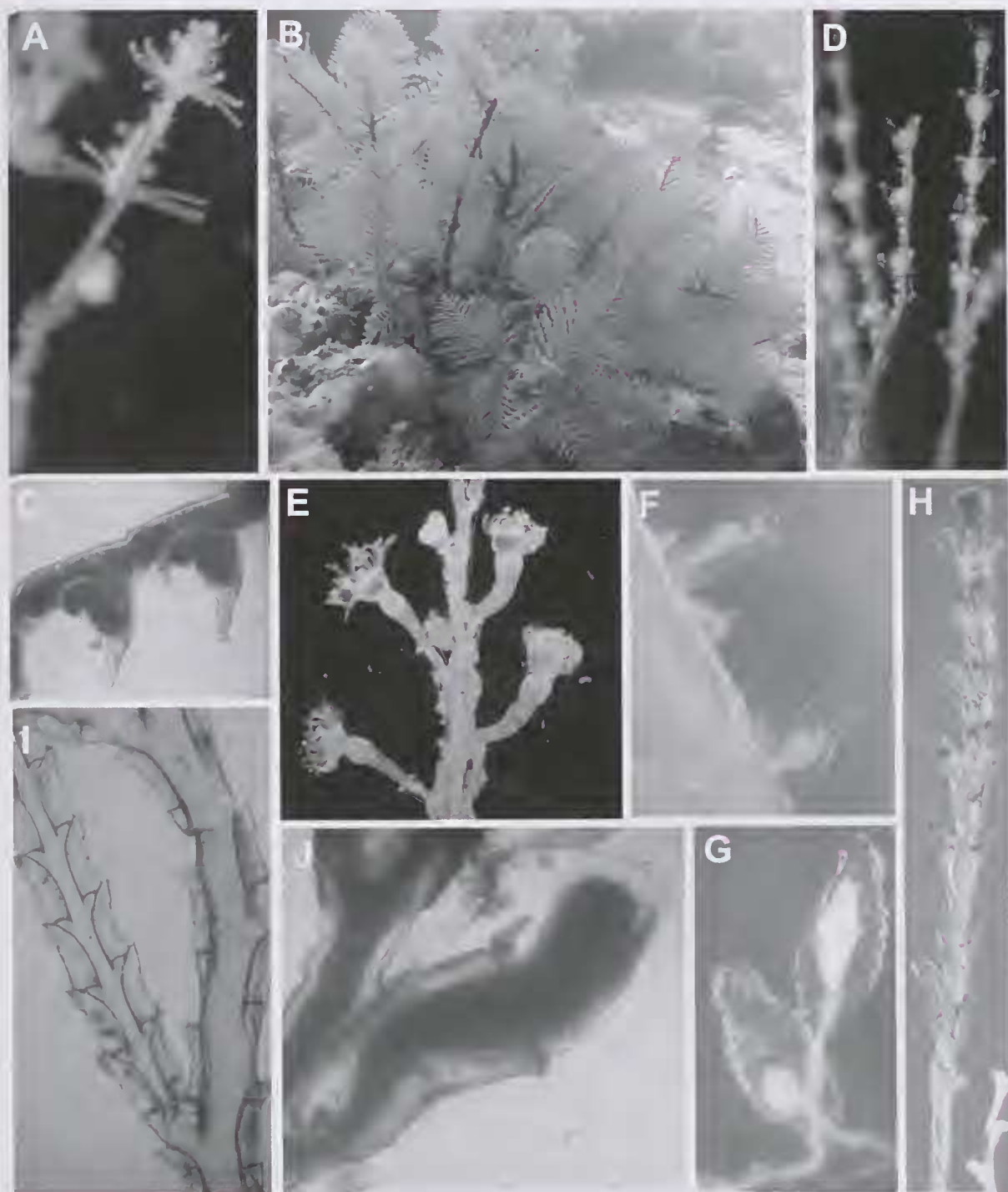
Egmundella amirantensis Millard & Bouillon, 1973: 40–42, fig. 5A–D; Millard, 1975:133, fig. 43G; Gibbons & Ryland, 1989: 389–290, fig. 7A, B; Ramil & Vervoort, 1992: 22–24, fig. 2a–d.

Lafoeina amirantensis — Calder, 1991: 10, fig. 3; Watson, 2000: 5, fig. 2A, B; Preker & Lawn, 2005: 340.

Description. Microscopic, stolonial colony reaching 0.5 mm in height, growing epizocially on the hydroid *Pennaria disticha*. Hydrothecae arising from a tubular hydrorhiza on a very short pedicel (sometimes so inconspicuous that it appears to be sessile), asymmetrical, turbinate, constricting basally and widening slightly towards the operculum. Operculum a cone-shaped lid consisting of up to 12 opercular valves. Nematothecae arising from hydrorhiza between hydrothecae, slightly bulbous and with a distal cluster of large, elongate nematocysts. Gonothecae not seen.

Measurements. Hydrotheca: depth 176–304 µm, marginal diameter below the operculum 72–88 µm. Nematotheca: length 68–72 µm, width 16–20 µm.

FIG 1. A, *Pennaria disticha* Goldfuss, 1820, QM-G331147, Amity Point, Nth Stradbroke I., SE Qld; B, *Sertularella diaphana* (Allman, 1885), a large, fertile colony, Moreton Bay (voucher lost); C, *Macrorhynchia phoenicea* (Busk, 1852), showing the abcauline, intrathecal septum stretching over half way across the hydrotheca; D, *Antennella secundaria* (Gmelin, 1791), QM-G331139, Cylinder Beach, Nth Stradbroke I., SE Qld; E, *Nemalécium lighti* (Hargitt, 1924), showing thick, modified tentacles, known as the nematodactyls, which can be seen on the lower left hydranth, Moreton Bay, voucher lost; F, *Hebellopsis costata* (Bale, 1884), Moreton Bay, voucher lost; G, *Calamptorea campaulata* (Warren, 1908), showing the margin with four, triangular, opercular valves, QM-G331141, Flat Rock, Nth Stradbroke I., SE Qld; H, *Diphasia digitalis* (Busk, 1852), showing characteristic, black-grey pigment granules within the colony, Moreton Bay, voucher lost; I, *Salacia tetracyllaria* Lamouroux, 1816, Moreton Bay, voucher lost; J, *Hincksella cylindrica* (Bale, 1888), showing gonothecae arising from within the hydrothecae, QM-G331144, Amity Point, Nth Stradbroke I., SE Qld.



Remarks. The Moreton Bay specimens closely agree with Millard & Bouillon's (1973) *Egunundella amirantensis* from Amirante Island, Seychelles, Indian Ocean. The nematothecae of the Moreton Bay specimen are best described as slightly bulbous rather than the club-shaped appearance of the Bermuda specimens shown by Calder (1991: fig. 3). Within this species, there does seem to be a considerable variation in nematothecae shape, as illustrated in Gibbons & Ryland (1989: fig. 7B). Migotto & Cabral (2005) discuss the uncertain affinity of *Lafocina amirantensis* based on life-history studies. The family Campanulinidae Hincks, 1868, is now considered a polyphyletic assemblage of genera containing hydroids with a cylindrical hydrotheca and conical operculum but with dissimilar life cycles. *Lafocina amirantensis* collected off the coast of São Sebastião released a medusa similar in morphology to the young medusa of *Cirrholovenia tetranema* Kramp, 1959, a species belonging to the family Cirrholoveniidae Bouillon, 1984 (Migotto & Cabral 2005). The puzzle regarding the life cycles of *C. tetranema* and *L. amirantensis* is, unfortunately, still ambiguous. Calder (1991) argues that *Lafocina* cannot be assigned to a family until more is known concerning its affinities. Migotto & Cabral (2005) give support to both families being reunited under the family name Lovenellidae Russell, 1953, but only after further, comprehensive, phylogenetic analyses.

Occurrence. Amity Point.

Distribution. Indian Ocean, Mediterranean Sea, Bermuda, Fiji, Australia.

Opercularella Hincks, 1868

Opercularella humilis (Bale, 1924)

Campanulina humilis Bale, 1924: 235–236, fig. 5; Jäderholm, 1926: 3, fig. 2.

Opercularella humilis — Rees, 1939: 444–445 (cum syn.); Vervoort & Watson, 2003: 24–26, fig. 1E–G.

(?) *Opercularella humilis* — Pennycuik, 1959: 175, pl. 2 figs 11, 12; Ralph, 1957: 846, text-fig. 8a–f; Dawson, 1992: 14.

Description. Small stolonial colony reaching 1.25 mm in height; growing on algae, the hydroids *Pennaria disticha* and *Halecium lighti*, and a subtidal piece of rotten wood. Mostly pedicellate, but with a few sparingly-branched

hydrothecae. Branches and main stem irregularly twisted or annulated throughout. Pedicel expands to base of hydrotheca. Hydrotheca very slender and terminates in an irregular operculum made up of converging segments. The hydrothecal perisarc is very delicate and most of the colony was badly crushed, making it impossible to count the number of tentacles and to see the webbing at their base.

Gonothecae not seen.

Measurements. Pedicel: length 125–700 µm, width 40 µm. Hydrotheca: depth 160–184 µm, marginal diameter below operculum 64–91 µm.

Remarks. Poor specimen, mostly unbranched and the branched colony had lost all but one of its hydrothecae. This specimen agrees with the description and illustrations given by Ralph (1957), but is smaller than the ones Pennycuik (1959) described from Currumbin.

Occurrence. Amity Point (on the rocky break-water).

Distribution. Queensland (Currumbin), New Zealand (including Campbell Island in the sub-Antarctic).

Family HALECIIIDAE Hincks, 1868

Halecium Oken, 1815

Halecium (?) *delicatumum* Coughtrey, 1876b

Halecium delicatumum Coughtrey, 1876b: 26, pl. 3 fig. 4; Bale, 1924: 235; Ralph, 1958: 334–338, figs 11e, h–n, 12a–p (syn.); Pennycuik, 1959: 173; Watson, 1973: 166; Millard, 1975: 145–147, fig. 47F–L; Watson, 1979: 234; Ramil & Vervoort, 1992: 82–85, fig. 20a–c; Migotto, 1996: 30–31, fig. 6d–e; Medel *et al.*, 1998: 31–33, fig. 1a–g; Medel & Vervoort, 2000: 12–13 (cum syn.); Vervoort & Watson, 2003: 88–91, fig. 16A–E; Watson, 2003: 245; Schuchert, 2005: 629–631, fig. 12A–B.

Description. Stiff, upright colonies. Stem monosiphonic or polysiphonic, divided into internodes by oblique nodes directed alternately left and right, branching irregularly. Hydrothecae arise from an apophysis near the distal end of each internode. Primary hydrotheca shallow, with walls widening towards the aperture, rim everted, a row of desmocytes on the wall of the hydrotheca just above the delicate diaphragm or pseudodiaphragm. Secondary hydrotheca pedicellate with a constriction at the base.

Gonophores not seen.

Measurements. Colony: height 5–6 mm, internode length 38–550 μm , diameter at node 100–110 μm . Hydrotheca: length 300–400 μm , diameter at rim 120–160 μm .

Remarks. Although the material agrees in detail with Ralph's (1958) New Zealand specimens and *H. delicatulum* from the Strait of Gibraltar (Medel *et al.* 1998), Schuchert (2005) has noted that *H. delicatulum* is almost indistinguishable from *Halecium mediterraneum* Weismann, 1883. Ralph (1958) and others considered that they might be conspecific; for details see Schuchert (2005). Vervoort and Watson (2003), however, did not synonymize them. The diagnosis is especially difficult due to the absence of clearly apomorphic characters. Schuchert (2005) suggests that genetic methods might hopefully clarify whether they really belong to the same biological species. Watson (personal communication) has noted that many species are collectively misidentified as *H. delicatulum*. In Moreton Bay, *H. delicatulum* can be found growing in profusion as an epiphyte on seaweeds and an epizoite on bryozoans and other hydroids.

Occurrence. Cylinder Beach.

Distribution. Cosmopolitan in tropical and subtropical waters.

Halecium sessile Norman, 1867

Halecium sessile Norman, 1867: 196; Ritchie, 1911: 812–813, pl. 87 figs 8, 9; Stechow, 1913: 9, 86, fig. 54; Billard, 1927: 329; Ralph, 1958: 331–332, figs 9h–i, 10c, d; Pennycuik, 1959: 174, pl. 3 fig. 3; Millard, 1975: 154–156, fig. 48K–M; Ramil & Vervoort, 1992: 85–86, fig. 20d; Watson, 1994b: 66; 2002: 340, fig. 1B, C; Hirohito, 1995: 27–29, fig. 7e–h; Preker, 2001: 154; Vervoort & Watson, 2003: 95–98, fig. 18H–M; Preker & Lawn, 2005: 341.

Description. Colonies small, stiff, erect, up to 4 mm high, geniculate and with one to two branches. Stem internodes widest distally; the nodes are transverse with only a slight slope. Hydrothecae shallow with straight sides, widening to margin which is not everted, diaphragm distinct, and a distinct row of desmocytes. Some hydrothecae are renovated, the secondary hydrothecae coming from within the primary hydrotheca where it is attached to the diaphragm. Length of internode is varied,

longest towards growing tip. The hydranth is large.

Gonophore not seen.

Measurements. Length of stem internode 490–600 μm , diameter at node 145–160 μm , primary hydrotheca depth 35–49 μm , diameter at rim 140–175 μm .

Remarks. The material examined generally agrees with the description of *Halecium sessile* but, as we have not seen the gonothecae, there must remain some doubt. Nevertheless, *Halecium sessile* has been reported from this region by Watson (2002) and it is probable, therefore, that our diagnosis is correct.

Occurrence. Amity Point (breakwater wall to the south).

Distribution. Cosmopolitan. This species occurs in all temperate and subtropical oceans.

Halecium tenellum Hincks, 1861

Halecium tenellum Hincks, 1861: 252, pl. 6 figs 1–4; Stechow, 1919: 41, figs J, K; Mammen, 1965a: 9, figs 35–36; Millard, 1975: 156–157, fig. 50F–L; Ramil & Vervoort, 1992: 90–91, fig. 21f, g; Medel *et al.*, 1998: 41–43, fig. 6a–d; Medel & Vervoort, 2000: 23–25; Vervoort & Watson, 2003: 98, fig. 19A, B; Preker & Lawn, 2005: 341.

Description. Colonies small, slender, monosiphonic, sparingly and irregularly branched, growing as epizoites on other hydroids. The stem is separated into distinct internodes by transverse nodes. Hydrothecae arising from short apophyses near distal ends of the internodes, and are directed to the right and left alternately, thereby giving the colony a geniculate appearance. Primary hydrotheca borne on a very short pedicel, secondary hydrotheca pedicellate. Hydrotheca shallow, widening to margin, which is strongly everted. Diaphragm and desmocytes distinct.

Gonothecae not seen.

Measurements. Colony: height 8 mm, internode length 400–650 μm , diameter at node 45–60 μm . Hydrotheca: length 30–40 μm , diameter at rim 130–141 μm .

Remarks. This small *H. tenellum* was found mainly on other hydroids, but it can be easily overlooked on other substrates. It is unfortunate that no fertile material was found as this species can only be identified with certainty if the

female gonothecae are present. Among the European *Halecium* species, *H. tenellum* and *H. delicatulum* were synonymized by García Corrales *et al.* (1978) but this has been rejected by a number of other authors; for details see Schuchert (2005). This record, therefore, must be regarded as doubtful. If verified, this would be the first time it has been recorded from Moreton Bay. More samples of the Haleciidae need to be collected from this region, both spatially and temporally, to increase the chances of obtaining fertile material and a better understanding of the species composition.

Occurrence. Flat Rock.

Distribution. Cosmopolitan.

Hydrodendron Hincks, 1874

Hydrodendron mirabile (Hincks, 1866)

Ophiodes mirabilis Hincks, 1866: 422–423, pl. 14 fig 1–5.
Ophiodes mirabilis — Stechow, 1919: 42; Cornelius, 1975a: 414–417, fig. 14a, b.

Hydrodendron mirabile — Rees & Vervoort, 1987: 12–13, 20; Cornelius, 1995a: 309–311, fig. 73A–G; Hirohito, 1995: 36–38, fig. 10a–g; Medel *et al.*, 1998: 43–45, fig. 7a–e; Medel & Vervoort, 2000: 26–28; Kirkendale & Calder, 2003: 166; Vervoort & Watson, 2003: 99–101, fig. 19E, F.

Ophiodes caciniiformis — Ritchie, 1907: 500–501, pl. 23 figs 11, 12, pl. 24 fig. 1, pl. 25 fig. 5.

Phylactotheca caciniiformis — Pennycuik, 1959: 174–175; Preker, 2001: 154.

Hydrodendron caciniiformis — Ralph, 1958: 342–344, figs 13b, c, 14a; Mammen, 1965a: 7, fig. 34; Hirohito, 1974: 9–12, fig. 3a–k; Millard, 1975: 158–160, fig. 51A–F; Rees & Vervoort, 1987: 20; Bouillon *et al.*, 1995: 4.

Description. Small colonies, stolonial in some parts, with erect stems arising at irregular intervals from hydrorhizae attached to algae, other hydroid colonies (especially *Halecium* sp.), and a piece of wood. Colony length to 5.1 mm, monosiphonic, and sparingly branched. Stem divided into short internodes which gradually lengthen towards the distal end of the colony and are marked by a slight swelling near the node. Each internode gives rise to an apophysis near the distal end. Hydrothecae borne on large, robust pedicels which remain attached even though the hydrotheca is often lost. Hydrotheca trumpet-shaped, with flaring wall and everted margins, a delicate, straight

diaphragm, and a conspicuous ring of desmocytes. Branches alternate and of variable length. Nematothecae scarce, deep, campanulate, with a slightly-everted margin, and are irregularly dispersed on hydrorhizae, stem internodes and hydrothecal pedicels.

Measurements. Internode: length 480–760 µm, diameter at node 80–100 µm. Hydrotheca: length 95–130 µm, diameter at rim 220–240 µm. Nematotheca: length 128–136 µm, diameter at rim 80–90 µm.

Remarks. The trophosome of the Moreton Bay material agrees in detail with *Hydrodendron mirabile* and with Millard's (1975) description of *H. caciniiformis* from South Africa, which is now reduced to a synonym of the present species. For details in designating the species to the genus *Hydrodendron* Hincks, 1874 see Cornelius (1975a, 1995a), and for a review of the species in this genus see Rees & Vervoort (1987). We did not find large colonies in Moreton Bay matching the size or description of the New Zealand *H. mirabile* (Vervoort & Watson, 2003), which can reach 200 mm in size, have thick, polysiphonic stems and bear pinnately-arranged hydrocladia. Pennycuik (1959) and Preker (2001) previously recorded *Phylactotheca caciniiformis* (Ritchie, 1907) from Queensland, a name now considered to be a synonym of *H. caciniiformis*; for details see Rees & Vervoort (1987).

Occurrence. Amity Point.

Distribution. Circumglobal in tropical, subtropical and temperate waters. Recorded from the Mediterranean, Atlantic Ocean, West Indies, Africa, Indian Ocean, Australia, New Zealand.

Nemalecium Bouillon, 1986

Nemalecium lighti (Hargitt, 1924)

(Fig. 1E)

Halecium lighti Hargitt, 1924: 489–490, pl. 4 fig. 13; Pennycuik, 1959: 173–174, pl. 3 figs 1, 2.

Nemalecium lighti — Bouillon, 1986: 73–79, figs 1–4, pl. 1 figs 1–3, pl. 2 figs 1–4, pl. 3 figs 1–4; Bouillon *et al.*, 1986: 65–67, fig. 1, pls. 1, 2; Calder, 1991: 27–30, figs 17a–d, 18a–d; Kirkendale & Calder, 2003: 166–167; Preker & Lawn, 2005: 341.

Description. Erect colonies up to 18 mm high arising from a creeping hydrorhiza. Stem monosiphonic and sparingly branched, nodes

distinct, internode with a distal apophysis occurring alternately on the right and then the left. Primary hydrothecae sessile, rarely renovated, margins not everted. Secondary hydrothecae pedicellate, rising either from within the primary hydrotheca, or lateral to it. Hydrotheca shallow, with a distinct diaphragm and a ring of large desmocytes. A distinguishing feature is the very large hydranth, with a prominent constriction beneath the tentacular ring. Many of the hydranths have a pair of short, thick, modified tentacles, the nematodactyls, which curve in towards the tentacles. These modified tentacles were present on all the living hydroids we examined but were easily detached when preserved, giving the impression that they occurred rarely if only preserved material were examined. The nematodactyls are heavily armed with large pseudostenoteles.

Measurements. Colony: height 16–14 mm, internode length 359–475 μm , diameter at node 80–91 μm . Hydrotheca: length to diaphragm 30 μm , diameter at rim 140–170 μm . Hydranth: length up to 1,340 μm . Nematocysts: pseudostenoteles 25x12 μm , microbasic mastigophores 6x2 μm .

Remarks. The nematodactyls and the presence of pseudostenoteles make *Nemalium lighti* (Hargitt, 1924) a species that is easy to recognise, at least in living material. It was noted, however, that many of the preserved colonies lacked the nematodactyls entirely, underlining the importance of studying live *Nemalium*. This species has previously been recorded from Myora and Dunwich by Pennycuik (1959). We failed to find it in these locations, but did find it to be common at Amity Point.

Occurrence. Amity Point.

Distribution. Bermuda, Indian and western Pacific Oceans.

Family HALOPTERIDIDAE Millard, 1962

Antennella Allman, 1877

Antennella secundaria (Gmelin, 1791)
(Fig. 1D)

Sertularia secundaria Gmelin, 1791: 3854.

Antennella secundaria — Billard, 1913: 8, text-fig. 1, pl. 1, figs 1–3; Pennycuik, 1959: 176–177, pl. 3,

figs 4, 5; Millard, 1975: 332–334, fig. 107F–J, K–L; Rees & Vervoort, 1987: 113–117, fig. 23a, b, tab. 20; Yamada & Kubota, 1987: 40; Ryland & Gibbons, 1991: 525–527, fig. 1A–D; Ramil & Vervoort, 1992: 143–145, fig. 37a–d; Calder, 1997: 29–32, fig. 7a–f (cum syn.); Schuchert, 1997: 14–18, figs 3a–g, 4a–e (cum syn.); Watson, 2000: 45–46, fig. 34A–D; Preker, 2001: 254; Watson, 2002: 346–347, fig. 5E, F; Vervoort & Watson, 2003: 345–347, fig. 83J–L; Schuchert, 2003: 206–209, fig. 57A–G; Kirkendale & Calder, 2003: 168; Preker & Lawn, 2005: 342; Preker, 2005: 48; Watson, 2005: 536–537, fig. 14A–B.

Material Examined. QM-G331139, Cylinder Beach, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Delicate, erect colonies, sometimes with one branch, 3–7 mm high, arising from tubular stolon attached to algae and other hydroids. Stem consisting of a long, basal athecate and distal thecate part. Basal part divided into variable numbers of segments by transverse nodes, remainder of stem heteromorphously segmented into thecate and athecate internodes by alternating oblique and transverse nodes. The thecate internode with one hydrotheca surrounded by four, two-chambered nematothecae: one median inferior, not reaching the hydrothecal base, two lateral on long apophyses and an axillar superior. Two small bithalamic nematothecae on the athecate internode.

Hydrothecae cup-shaped, with parallel walls, a small hydrophore at the base of the abcauline wall, and a sinous margin. Nematothecae bithalamic, small, mobile, and with a scoop-like distal chamber, the adcauline wall being greatly reduced. The lateral nematothecae reaching near the rim of hydrothecae.

Gonothecae not seen.

Measurements. Internode lengths: athecate 168–344 μm , thecate 152–384 μm . Diameter at transverse node 48–56 μm . Hydrotheca: abcauline length 120–160 μm , free adcauline length 136–140 μm , aperture 196–220 μm . Nematothecae: lateral nematothecae: overall length 88–106 μm , cup diameter 40–49 μm ; mesial nematotheca: overall length 88–90 μm , cup diameter 28–40 μm .

Remarks. Unbranched colonies were the most common, but colonies with one branch were

also present. The branch arises from an apophysis on the posterior surface of the basal athecate internode.

Occurrence. Dunwich (Pennycuik 1959), Flat Rock, Shark Gutter, Cylinder Beach, Amity Point.

Distribution. Cosmopolitan in temperate and tropical seas.

Halopteris Allman, 1877

Halopteris polymorpha (Billard, 1913)

Plumularia polymorpha Billard, 1913: 24–25, figs 14A–C, 15.

Antennella polymorpha — Vervoort, 1941: 218.

Halopteris buskii — Rees & Thursfield, 1965: 160; Gibbons & Ryland, 1991: 527–528, fig. 2A–C; Migotto, 1996: 48–50, fig. 9f–h; Preker, 2001: 154; Preker, 2005: 48.

Halopteris polymorpha — Pennycuik, 1959: 178; Millard & Bouillon, 1973: 83–84, fig. 10F–J; Millard, 1975: 354–355, fig. 112G–L; Gibbons & Ryland, 1991: 530–532, fig. 4A–C; Schuchert, 1997: 64–73, figs 20a–f, 21a–h, 22a–h, 23a–f (rev.); Watson, 2000: 46–47, fig. 35A–H; Preker, 2001: 154; Kirkendale & Calder, 2003: 169; Preker, 2005: 49; Preker & Lawn, 2005: 342.

Description. Delicate, plumose, erect colony reaching 9 mm; basal part athecate but with various numbers of nematothecae in two rows, terminating in an oblique hinge-joint. Distal part of stem segmented into thecate internodes by oblique nodes. Each internode bears a hydrotheca on the front part of the stem, alternate hydrocladia arising by a short apophysis at the side of the hydrotheca, and six nematothecae: one median inferior, a pair of laterals, one axillar and two distal.

Hydrocladium heteromerous, bears hydrothecae on anterior surface. A long apophysis is followed by a short athecate segment without nematothecae. Remaining segments alternate between athecate and thecate internodes divided by transverse and oblique nodes. Thecate internodes with a hydrotheca and four nematothecae: one median inferior, not reaching the base of the hydrotheca, a pair of laterals on long pedicels of very-variable lengths, and a small axillar one. Athecate internode slightly shorter with one, rarely two, nematothecae.

Hydrotheca cup-shaped with straight, parallel, abcauline and adcauline walls, and adnate

for about half its length, with rim slightly flaring.

Median inferior nematothecae two-chambered, scoop-shaped with no adcauline wall. Lateral nematothecae on short pedicels, movable, with shallow distal chamber, most reaching the rim of the hydrotheca, but a few overreaching the rim. Axillar nematothecae short and robust, cup with depression on adcauline side.

Gonothecae not seen.

Measurements. Stem: thecate internode length 320–420 µm, diameter at node 50–56 µm. Hydrocladium: thecate internode length 260–340 µm, athecate internode length 150–260 µm, diameter at node 33–38 µm. Hydrotheca: abcauline wall length 112–180 µm, free adcauline wall length 80–88 µm, aperture 152–160 µm.

Remarks. Only a few small colonies of this delicate, extremely variable species were collected. They fall within the range of variation of *Halopteris polymorpha* defined by Schuchert (1997). Although it is difficult to separate from *H. buskii* in the absence of gonothecae, *H. polymorpha* is a species predominantly occurring in tropical waters, whereas *H. buskii* has only been identified reliably from southern waters. *Halopteris polymorpha* has not been collected previously from Moreton Bay.

Occurrence. Flat Rock.

Distribution. Indian and Pacific Oceans, French Polynesia, Brazil (São Sebastião), tropical eastern Australia.

Family HEBELLIDAE Fraser, 1912

Anthohebella Boero, Bouillon & Kubota, 1997

Anthohebella parasitica (Ciamician, 1880)

Lafoea parasitica Ciamician, 1880: 673–676, pl. 39, figs 1–4.

Hebella parasitica — Marktanner-Turneretscher, 1890: 213–214; Vervoort & Vasseur, 1977: 12–13, fig. 3a–c; Boero, 1980a: 133–136, figs 1a, b, 2, 3a–g, 4, 5a, b, 6, 7a, b; Boero, 1980b: 142 fig. 1; Gibbons & Ryland, 1989: 394–395, fig. 13A, B; Watson, 1996: 78; Preker, 2001: 154.

Anthohebella parasitica — Boero, Bouillon & Kubota, 1997: 24–25, fig. 13a–c; Vervoort & Watson, 2003: 64, fig. 7H–K; Preker & Lawn, 2005: 203.

Description. Colonies epizoic on the hydroid *Sertularella diaphana*, stolonial, with hydrothecae

arising at irregular intervals on slightly-twisted pedicels of variable length. The hydrothecae tend to occupy the free spaces between the hydrocladia of the host hydroid. Hydrotheca large, campanulate, asymmetrical, with margin strongly everted and sometimes renovated. Diaphragm thin and often very difficult to observe.

Gonotheca larger, widens towards truncated end, borne on a short pedicel.

Measurements. Hydrotheca: length 990–1,000 µm, marginal diameter 410–600 µm, pedicel length 250–480 µm. Gonotheca: length 1,895 µm.

Remarks. In the material examined, both *A. parasitica* and *Hebellopsis scandens* were found on *S. diaphana* among numerous other epizoids. The two species were never found to coexist on the same colony of *S. diaphana*.

Occurrence. Amity Point.

Distribution. Warm subtropical and tropical waters of the Atlantic, Indian and Pacific Oceans, and the Mediterranean. Recorded from Western Australia, Northern Territory (Beagle Gulf), Gulf of Carpentaria, and the Coral Sea.

Hebellopsis Hadzi, 1913

Hebellopsis costata (Bale, 1884)

(Fig. 1F)

Campanularia costata Bale, 1884: 56–57, pl. 1 fig. 3.

Hebella costata — Stechow & Müller, 1923: 463; Billard, 1941: 13–15, figs 3, 4; Pennycuik, 1959: 188; Boero, Bouillon & Kubota, 1997: 35.

Hebellopsis costata — Watson, 2000: 6, fig. 3A, B; Preker & Lawn, 2005: 340.

Description. Hydorhiza creeping on stems and branches of the hydroid *Idiellana pristin*. Hydrothecae borne on short, thick and slightly-wrinkled pedicel. Hydrothecae long and tubular, with eight or more deep annulations. The annulations are best developed distally, becoming less distinct towards the rounded base of the hydrothecae. Margin of hydrotheca circular, replicated, rim distinctly flared. Thin, indistinct diaphragm present.

Measurements. Pedicel 108–132 µm. Hydrotheca: length 992–1,312 µm, diameter at margin 448–489 µm.

Remarks. When revising *Hebella* Allman, 1888, Boero *et al.* (1997) considered *Hebellopsis costata*

to be a doubtful species. Watson (2000) did not agree and gave reasons for finding this opinion untenable. Our material conforms well with Bale's (1884) description and illustrations and, as Pennycuik (1959) also recorded it from several locations within Moreton Bay, we include it here as being still abundant in Moreton Bay. Species are currently being assigned to genus based on the degree of medusae reduction, so collection of fertile material is essential to gain further information on the life cycle.

Occurrence. Amity Point. Pennycuik (1959) also recorded it from Bribie Island and between St. Helena Island and Mud Island.

Distribution. Indian Ocean, Australia.

Hebellopsis scandens (Bale, 1888)

Lafoea scandens Bale, 1888: 758–759, pl. 13 figs 16–19.

Hebella scandens — Marktanner-Turneretscher, 1890: 214, pl. 3 fig. 16; Bale, 1913: 117–120, pl. 12 fig. 10; Mulder & Trebilcock, 1915: 54, pl. 7 figs 4, 5; Stechow, 1919: 77–78, fig. Z; Mammen, 1965a: 4–5, fig. 31; Millard & Bouillon, 1973: 59–60; Millard, 1975: 182–184, fig. 60F, G; Migotto, 1996: 26–27, fig. 6a, b; Watson, 1979: 234; Gibbons & Ryland, 1989: 395, fig. 14A, B; Watson, 1994b: 66; Boero *et al.*, 1997: 8; Preker, 2001: 154; Preker, 2005: 47.

Hebellopsis scandens — Calder, 1991: 43–45, fig. 27; Watson, 2000: 6–7, fig. 3B, C; 2002: 338–340, fig. 1A; 2003: 66–68, fig. 9A–I; Preker & Lawn, 2005: 340.

Description. Epizoic on *Sertularella diaphana* (Allman, 1885), where the hydorhiza intertwines the polysiphonic stem of the host. Hydrothecae borne on short pedicels, long and tubular, widening slightly distally and often curving towards the host. Considerable variability in shape of hydrotheca, margin entire, slightly flaring and frequently renovated.

Gonophore larger than hydrotheca, arising from a short pedicel and widening towards the margin. Gonotheca closed by an operculum consisting of four valves. It contains two medusa-buds, one above the other.

Measurements. Hydrotheca: depth 699–1,002 µm, marginal diameter 190–301 µm. Gonotheca: depth 1,200 µm, marginal diameter 620 µm.

Remarks. The Moreton Bay specimens closely resemble the descriptions and size given by

Millard (1975) for South African material. The range of the Moreton Bay material is outside the sizes given by Gibbons & Ryland (1989) for Fiji. Watson (2003), however, remarks that there is considerable variability in the shape and size of the hydrothecae in this species. Millard (1975) reported that the stolon of *H. scandens* lay within the perisarc of the host. Physical penetration of host perisarc by the hydrorhiza was not observed in the Moreton Bay specimens, but there was a very close association and there may have been penetration inside some of the host's polysiphonic stem bundles.

Occurrence. Amity Point.

Distribution. Cosmopolitan.

Family LAFOEIDAE A. Agassiz, 1865

Filellum Hincks, 1868

Filellum serratum (Clarke, 1879)

Lafaea serrata Clarke, 1879: 242, pl. 4 fig. 25; Ritchie, 1911: 818–820.

Reticularia serrata — Ralph, 1958: 312, text-figs 2j, 3a.

Filellum serratum — Hargitt, 1924: 488; Millard, 1975: 178, fig. 59A, B; Calder, 1991: 36, fig. 21; Ramil & Vervoort, 1992: 354–355; Hirohito, 1995: 110–112, fig. 31a–c; Pe a Cantero *et al.*, 1992: 304–308, figs. 1a–c, 2a–c; Vervoort & Watson, 2003: 59–60.

Filellum ?serratum — Watson, 2000: 5–6, fig. 2C.

Description. Small, stolonial, sessile hydroid arising from a creeping hydrorhiza growing epizoically on the hydroid *Idiellana pristis*. The hydrotheca is tubiform and, for about half of its length, is adnate to the hydrorhiza, with the free portion bent outwards. The adnate part has various numbers of transverse ridges on the upper surface, the margin of the hydrotheca is slightly everted and many are renovated.

Coppinia not seen.

Measurements. Hydrotheca: adnate length 225–300 µm, free length 200–250 µm, aperture 75–95 µm.

Remarks. It is difficult to distinguish this species, with certainty, in the absence of a coppinia. Fertile *Filellum serratum* have not been seen frequently, with only Ritchie (1911) describing coppinia from Australian waters and Millard (1975) from South Africa. The striations are, however, typical of *F. serratum*.

Specimens widely distributed, epizoic on *Idiellana pristis*.

Occurrence. Amity Point, Cylinder Beach, Shag Rock, Flat Rock.

Distribution. Circumglobal.

Family PLUMULARIIDAE McCrady, 1857

Plumularia Lamarck, 1816

Plumularia setacea (Linnaeus, 1758)

Corallina setacea Ellis, 1755: 19, pl. 11a, A.

Sertularia setacea Linnaeus, 1758: 813.

Plumularia setacea — Lamarck, 1816: 129; Hincks, 1868: 296–299, pl. 66 figs 1, 1a; Bale, 1888: 778–779, pl. 20 figs 14–18; Trebilcock, 1928: 24; Pennycuik, 1959: 180; Ralph, 1961b: 33–36, text-figs 3d–e, 4a–d; Millard, 1975: 399–401, fig. 124E–K; Calder, 1997: 17–21, fig. 4a–d (cum syn.); Watson, 2000: 53–55, fig. 41A, B; Vervoort & Watson, 2003: 398–402, fig. 97A–G; Preker & Lawn, 2005: 343.

Description. Colony consisting of erect stems arising from hydrorhizae attached to algae and to the hydroid *Sertularia turbinata*. Stems monosiphonic reaching 12 mm in height, unbranched but bearing alternate hydrocladia and supported by an athecate basal section. Thereafter, divided into regular internodes by slightly-oblique nodes. Each internode bearing one distal hydrocladial apophysis and two nematothecae, one inferior-opposite and one axillar of the apophysis. Apophysis antero-lateral, with two transverse nodes and bearing a small mamelon on the upper surface near the node.

Hydrocladia bearing hydrothecae on upper surface, separated by oblique nodes, alternating between short athecate and long thecate internodes. Thecate internodes with three nematothecae; one median inferior and two lateral, which overtop the margin of the hydrotheca. Athecate internode has two internodal septae, one proximal and one distal, and one medial nematotheca in the basal third of the internode.

Hydrotheca cup-shaped, adnate for most of its vertical height, widening to the margin and with no internal septum. Nematothecae two-chambered and mobile. Mesial nematotheca with short basal chamber and a slightly-lower wall on the adcauline side. Lateral nematothecae on long basal chambers, movable, with a small

circular cup reaching or, sometimes, overreaching the hydrothecal margin, slightly lower on the adcauline side.

Gonothecae not seen.

Measurements. Stem: length 280–480 μm , diameter at node 80–96 μm . Hydrocladia: basal segment 24–48 μm , thecate internode length 177–200 μm , athecate internode length 100–116 μm , diameter at node 33–48 μm . Hydrotheca: abcauline wall length 76–80 μm , aperture 80–112 μm . Nematothecae: axial basal: stem 32–40 μm , cup 12–20 μm ; hydrocladial medial inferior: stem 28–44 μm , cup 16–20 μm .

Remarks. This identification may well be doubtful for the following reasons. It is not possible to reliably distinguish between *Plumularia warreni* Stechow, 1919, *P. strictocarpa* Pictet, 1893, and *P. setacea* in the absence of gonothecae. All the Moreton Bay material was in non-reproductive condition. Furthermore, the distribution of the three species did not help in determining the most likely species as they tend to overlap. Pennycuik (1959) recorded *P. warreni* from Point Lookout and Currumbin and *P. setacea* from Point Lookout, Bribie Island and Myora. In the absence of any reliable distinguishing features, we used Pennycuik's (1959) 'Key to Species' to tentatively identify our colonies as *P. setacea*. Pennycuik noted that when the hydrothecal mouth diameter was greater than the hydrothecal depth, this was associated with mature, female gonothecae possessing external marsupia, the situation found in *P. warreni*. When the hydrothecal mouth diameter was about equal to the hydrothecal depth, this was associated with the type of female gonothecae found in *P. setacea*. The aperture diameter of our colonies was equal to, or slightly greater than, the hydrothecal depth, suggesting that they may be *P. setacea*. *Plumularia setacea* is also known to be a highly variable species and to occur as small, epizoid forms, a situation that we also encountered with our colonies.

Occurrence. Bribie Island, Point Lookout, Myora and Flat Rock.

Distribution. Circumglobal in the tropical, subtropical, and temperate regions of the Atlantic, Pacific and Indian Oceans.

Family SERTULARIIDAE Lamouroux, 1812

Calamphora Allman, 1888

Calamphora campanulata (Warren, 1908)
(Fig. 1G)

Sertularella campanulata Warren, 1908: 300–302, pl. 47 figs 21, 22.

Calamphora campanulata — Stechow, 1919: 83; Mammen, 1965a: 35, fig. 67a, b; Millard, 1975: 253, fig. 83F; Gibbons & Ryland, 1989: 407, fig. 25A, B; Watson, 1996: 78; 1997: 521–522, fig. 5E, F; Preker, 2005: 47; Preker & Lawn, 2005: 339.

Thyroscyphus campanulatus — Pennycuik, 1959: 198.

Material Examined. QM-G331141, Flat Rock, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Stolonal colony creeping on algae and polychaete tubes. Hydrothecae solitary, borne on short, twisted, corrugated pedicels, some of which have up to two annulations near the base of the hydrothecae. Hydrothecae terminal, barrel-shaped, with 7–11 transverse annulations or ridges, tapering basally towards the pedicel and distally to a square neck. Margin with four, pointed, slightly-everted cusps, and four triangular opercular valves.

Gonothecae not seen.

Measurements. Pedicel length 80 μm . Hydrotheca (two size-classes given): height 400–576 μm and 656–960 μm , maximum diameter 144–160 μm and 200–295 μm , marginal diameter 144 μm .

Remarks. This is the first record of *C. campanulata* occurring epizoidally, having previously been recorded only from algae. The hydrothecae and pedicels of *C. campanulata* from Moreton Bay show a much greater range in size than those found by Mammen (1965a), Millard (1975) and Gibbons & Ryland (1989). They tend to fall into two size-classes (see measurements above): both size-classes occurred on the same alga or polychaete tube, but it was not possible to determine if they actually arose from the same stolon. Mammen (1965a) describes the gonothecae as similar to the hydrothecae but wider and with a bulging shape. We had to rule out the larger forms being gonothecae when one was found to contain a hydranth with tentacles. New, fertile material needs to be examined before further conclusions can be drawn.

Occurrence. Flat Rock.

Distribution. South Africa (Natal), Madagascar, India, Indo-China, Japan, Australia.

Diphasia L. Agassiz, 1862

Diphasia digitalis (Busk, 1852)

(Fig. 1H)

Sertularia digitalis Busk, 1852: 393.

Desmoscyphus longitheca — Allman, 1877: 26–27, pl. 14 figs 3–6.

Diphasia digitalis — von Lendenfeld, 1885b: 415; Bale, 1884: 101, pl. 9 figs 3–5; Jäderholm, 1916: 5; Pennycuik, 1959: 191; Millard, 1975: 257–258, fig. 85E; Watson, 1996: 78; Watson, 2000: 14–15, fig. 10A, B; Schuchert, 2003: 166, fig. 25A, B.

Description. Colony comprising short stems arising from a creeping stolon. Stems bearing from four to nine pairs of hydrothecae. Only one colony was branched, with a pair of alternate hydrocladia. A hinge-joint occurs near the base separating the athecate part of the stem; the rest of stem is subdivided by indistinct, transverse nodes. Each internode bearing one pair of lateral hydrothecae.

Hydrothecae are long tubes, expanding to distal part, which is curved slightly away, adnate for more than three-quarters of the length, consecutive pairs very close. Margin of hydrotheca quadrangular, no internal cusps or ridges, one large operculum attached to adcauline rim of hydrotheca.

Gonothecae not observed.

Colour. Colonies had characteristic, black-grey, pigment granules which give them an overall grey appearance.

Measurements. Hydrotheca: length of adnate adcauline wall 560–620 µm, length of free adcauline wall 155–280 µm, length of abcauline wall 615–760 µm, diameter across margin 200–234 µm.

Remarks. The characteristic blackish-grey colour clearly identifies this material as *Diphasia digitalis*. Found as an epizoite on the hydroid *Idiellana pristis* (Lamouroux, 1816). Previously reported from Moreton Bay by Pennycuik (1959).

Occurrence. Amity Point, Polka Point (Dunwich), channel between St. Helena and Mud Islands.

Distribution. Circumglobal in tropical and subtropical areas.

Diphasia mutulata (Busk, 1852)

Sertularia mutulata Busk, 1852: 391.

Diphasia mutulata — Bale, 1884: 101–102, pl. 9 figs 6–9; Billard, 1933: 16, text-fig. 6H–J, pl. ?? fig. 4; Watson, 1996: 78; 2000: 12–14, fig. 9A–G; Schuchert, 2003: 166–168, fig. 26A–D.

Nigellastrum mutulatum — Stechow & Müller, 1923: 468–469.

Description. Colonies with simple stems from 4–8 mm high, arising at intervals from a tubular hydrorhiza creeping over the hydroid *Idiellana pristis*. Colonies with terminal stolonization common. Proximal stem region athecate, terminating in a hinge joint; rest of stem divided by indistinct, transverse nodes. One pair of opposite hydrothecae to an internode, successive pairs of hydrothecae well separated. Hydrothecae tubular and somewhat angular in shape, especially in the basal part of the colony, widening to margin, which is curved outwards and slightly upwards. Hydrotheca adnate for about two thirds of its adcauline length. Adcauline wall of hydrotheca with a transverse, intrathecal ridge. Margin of hydrotheca untoothed, with one large, delicate, adcauline operculum.

Gonothecae not observed.

Colour. Pale brown.

Measurements. Hydrotheca: length adnate adcauline wall 400–480 µm, length free adcauline wall 90–190 µm, diameter across margin 180–200 µm.

Remarks. *Diphasia mutulata* from Moreton Bay showed some variation in stem forms but we were unable to distinguish the two distinct morphs described by Watson (2000). The hydrothecae also showed some variation, even within the same stem, but not outside the range described for *D. mutulata* by Watson (2000) and Schuchert (2003). Bale (1884) noted that it was collected in Queensland from Port Molle (Whitsunday Is Group) by William Haswell.

Occurrence. Flat Rock.

Distribution. Indonesia, Andaman Sea, Red Sea, Torres Strait, northern Australia, Queensland.

Dynamena Lamouroux, 1812

Dynamena crisioides Lamouroux, 1824

Dynamena crisioides Lamouroux, 1824: 613, pl. 90 figs 11, 12; Billard, 1925: 181–185, figs 36A, B, 37C–E,

pl. 7 fig. 21; Blackburn, 1937b: 172–173, fig. 3; Briggs & Gardner, 1931: 190–191; Pennycuik, 1959: 192; Millard, 1975: 263–264, fig. 87A–F; Gibbons & Ryland, 1989: 410–411, fig. 28A–D; Calder, 1991: 89–92, figs 47a, b, 48a–c (cum syn.); Migotto, 1996: 60–61, fig. 11e–g; Preker, 2001: 154; Schuchert, 2003: 170–171, fig. 28A–D; Preker, 2005: 48; Preker & Lawn, 2005: 341.

Material Examined. QM-G331143, Flat Rock, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Colonies small, examined material reaching 12–20 mm, monosiphonic. Stem with a short, basal, athecate section terminated by a transverse node, then a short portion lacking hydrocladia but with a pair of subopposite hydrothecae, and terminated by an oblique node. The remainder of the colony is divided into regular internodes by oblique nodes, each internode with a long, hydrocladial apophysis basally, and with a variable number of subopposite hydrothecae, one always axial of the apophysis, the others in two rows.

Hydrothecae tubular, adnate for more than half of the adcauline length, then curved outwards. Abcauline thecal wall thickened, margin with two, pointed lateral cusps and one, weak adcauline cusp. Operculum composed of two valves, upper valve smaller than the lower.

Gonothecae arising below hydrothecae on both stem and hydrocladia, ovate, and with a deeply-irregular, crinkled wall, opening on a long, off-centre, slightly-curved neck.

Measurements. Hydrotheca: length adnate adcauline wall 380–460 µm, length free adcauline wall 100–240 µm, diameter at opening 120–140 µm. Gonotheca: length 1,100 µm, diameter 420 µm, margin diameter 180 µm.

Remarks. This is recognised as a highly-variable species. The Moreton Bay samples show variation in the number of hydrothecae to an internode, with two as the usual number on the stem. The number of hydrocladia on each stem also varies, from none to three.

Occurrence. Point Lookout, Amity Point, Flat Rock, Shag Rock, Shark Gutter, Myora, Point Cartwright, Caloundra, Redcliffe, Cleveland, Nerang River, Currumbin.

Distribution. Cosmopolitan in tropical and subtropical waters.

Dynamena quadridentata (Ellis & Solander, 1786)

Sertularia quadridentata Ellis & Solander, 1786: 57 pl. 5 fig. g, G.

Pasythea quadridentata — Lamouroux, 1816: 156, pl. 3 figs 8a, B; Bale, 1884: 112, pl. 7 fig. 3.

Dynamena quadridentata — Billard, 1925: 194–198, fig. 42 U–W; Blackburn, 1938: 320; Pennycuik, 1959: 193; Ralph, 1961a: 790, fig. 13c; Millard, 1975: 266–268, fig. 87G–J; Gibbons & Ryland, 1989: 411–414, figs 29A–C, 30A–C; Calder, 1991: 96–98, fig. 51a–c; Vervoort, 1993: 108–109; Watson, 1996: 78; 1997: 520, fig. 5C; 2000: 15, fig. 10C–E; Preker, 2001: 154; Watson, 2002: 341–343, fig. 2C–F; Vervoort & Watson, 2003: 131, fig. 26C; Preker & Lawn, 2005: 339.

Material Examined. QM-G331142, Myora, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. A few, small colonies growing on the stem of *Sertularella diaphana* (Allman, 1885). The colonies were very dirty and in poor condition, so no description or measurements of the material were made. The colonies were sterile.

Remarks. This is a fairly well-known species. The material from Moreton Bay is in full agreement with Billard's (1925) account of Indonesian specimens of the typical form. Previously recorded from various southern and eastern Australian waters.

Occurrence. Myora, Flat Rock, channel between St. Helena and Mud Islands.

Distribution. Circumglobal in warm temperate and tropical waters.

Idiellana Cotton & Godfrey, 1942

Idiellana pristis (Lamouroux, 1816)

Idia pristis Lamouroux, 1816: 199, pl. 5 fig. 5; Bale, 1884: 113–114, pl. 7 figs 1, 2, pl. 19 fig. 33; Jäderholm, 1916: 7; Bale, 1924: 249.

Idiella pristis — Stechow, 1919: 106; Stechow & Müller, 1923: 469; Briggs & Gardner, 1931: 191; Blackburn, 1942: 116–117.

Idiellana pristis — Cotton & Godfrey, 1942: 234; Pennycuik, 1959: 193; Ralph, 1961a: 766, fig. 5c–e; Millard, 1975: 269–270, fig. 88A–E; Migotto, 1996: 65–68, fig. 12h, i; Watson, 1996: 78; 2000: 19–20, fig. 14A–E; Schuchert, 2001: 175–176, fig. 32A–D; Vervoort & Watson, 2003: 143; Preker & Lawn, 2005: 339.

Material Examined. QM-G331145, Flat Rock, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Large, conspicuous colonies arising from a tangled hydrorhiza. Stem up to 110 mm high, monosiphonic, divided into regular internodes by slightly-oblique nodes which slope in alternate directions. Proximal stem athecate, with hydrocladial apophyses but no hydrocladia. Subsequent stem internode with one proximal hydrocladial apophysis and three hydrothecae, one in the apophysal axis and an alternate pair above.

Hydrocladia alternate, unbranched, hydrocladial internodes long and irregular, bearing up to nine pairs of alternate, overlapping hydrothecae on the anterior face, the two rows of hydrothecae contiguous with one another.

Hydrothecae tubular, adnate for over half their length, free part projecting outwards, each adnate to those above and below and to those opposite. Aperture rounded with two lateral cusps, directed slightly upwards. Operculum consisting of one, thin, adcauline valve not sharply demarcated from hydrotheca.

Gonothecae borne on front of stem and hydrocladia, abundant throughout colony, large, barrel-shaped, with either longitudinal ribs, or almost smooth with only faint undulations, rounded at base, truncated above, aperture on elevated, tubular neck with a slightly everted margin.

Colour. Pale brown.

Measurements. Stem: length of internode 900–1,600 μm , width at node 430–610 μm . Hydrocladium: length of internode 1,200–3,400 μm , width at node 120–140 μm . Hydrotheca: length 460–610 μm , diameter at opening 150–200 μm . Gonotheca: length 1,600–1,700 μm , diameter 820–920 μm , margin diameter 450–550 μm .

Remarks. This species is easy to identify, the double row of projecting, alternate hydrothecae on the broad, anterior surface of the hydrocladia bears a resemblance to the rostrum of the saw-fish, *Pristis*, after which the species was named. *Idiellana pristis* was not only very abundant and conspicuous, but also the host of a number of other species of hydroids such as: *Filellum serratum* (Clarke, 1879), *Diphasia digitalis* (Busk, 1852), and *Hebellopsis costata* (Bale, 1884).

Occurrence. Flat Rock, Shark Gutter, Myora, channel between St. Helena and Mud Islands.

Distribution. Circumglobal; tropical, subtropical.

Salacia Lamouroux, 1816

Salacia desmoides (Torrey, 1902)

Sertularia desmoidis Torrey, 1902: 65–66, pl.8, figs 70–72.

Sertularia desmoides — Fraser, 1911: 72; Billard, 1924a: 66; Fraser, 1938: 10, 54.

Salacia desmoides — Stechow, 1922: 150; 1923b: 213; Millard, 1975: 274, fig. 90A–C; Medel Soteras *et al.*, 1991: 510–512, fig. 3A–B; Boero & Bouillon, 1993: 264; Medel & Vervoort, 1998: 30–32; Watson, 1997: 518, fig. 5A, B; Watson, 2002: 341, fig. 2A, B; Vervoort & Watson, 2003: 148–151, fig. 33D–F.

Description. Colonies epizoic on the hydroid *Idiellana pristis*. Short stems, up to 9 mm high, rising from stolon, unbranched, with a basal athecate section ending in an oblique hinge-joint. The rest of the colony is divided into internodes by v-shaped nodes. Hydrothecae biserrate, paired, tubular, contiguous in front, separated behind, adnate for over half their length, then curved outwards. Margin without teeth and with one opercular flap attached to the abcauline wall.

Gonothecae on lower stem arising from short pedicels below hydrothecae, barrel-shaped, with some irregular, circular lines, disappearing on distal parts of gonothecae.

Colour. Cream yellow.

Measurements. Hydrotheca: length adnate adcauline wall 180–200 μm , free adcauline wall 226–300 μm , diameter at rim 150–170 μm . Gonotheca: length 1,900 μm , diameter 810 μm , margin diameter 500 μm .

Remarks. The oblique margin with the abcauline, opercular valve is characteristic of this species. The material could be identified positively because of the presence of one gonotheca. Previously recorded from south-east Queensland by Watson (2002).

Occurrence. Shark Gutter.

Distribution. Southwest North America (California), southwest Indian Ocean, Mediterranean Sea, Australia (Western Australia, southeast Queensland).

Salacia hexodon (Busk, 1852)

Pasythea hexodon Busk, 1852: 395; Bale, 1884: 113, pl. 19 fig. 13; Bale, 1888: 771, pl. 14 figs 8, 9; Jäderholm, 1916: 5.

Salacia hexodon — Billard, 1925: 207–208, fig. 49C, D; Pennycuik, 1959: 194; Watson, 1996: 78; Watson, 2000: 21–22, fig. 16A, B; Schuchert, 2003: 176–177, fig. 33; Preker & Lawn, 2005: 339, 342.

Material Examined. QM-G331148, Peel Island, Moreton Bay, SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Irregularly-branched, monosiphonic colonies. Stem divided into long, regular internodes by transverse nodes, groups of hydrothecae clustered in distal part of internode. Hydrothecae on lateral side of stem grouped in three to five overlapping, sub-opposite pairs. Hydrothecae tubular, adnate for about half their adcauline length, distal half curving out and, in many, slightly downwards, margin sinuate and closed by an abcauline operculum.

Gonothecae not seen.

Measurements. Internode length 2,000–2,100 µm. Hydrotheca: length adnate adcauline wall 300–450 µm, length free adcauline wall 285–300 µm, diameter at rim 230–270 µm.

Remarks. Although only four, small, dirty colonies were found, the characteristic clustering of the hydrothecae on the anterior surface of the hydrocladia makes this species easy to identify. Previously recorded from Moreton Bay by Pennycuik (1959).

Occurrence. Amity Point, Peel Island.

Distribution. Indonesia, tropical waters of Australia (Torres Strait, Northern Territory (Darwin), Queensland).

Salacia tetracythara Lamouroux, 1816

(Fig. 11)

Salacia tetracythara Lamouroux, 1816: 212, pl. 6 fig. 3a–c; Billard, 1925: 202–204, pl. 8 figs 27, 28, text-fig. 48O–T, pls 27, 28; Pennycuik, 1959: 194; Mammen, 1965a: 54, fig. 87; Gibbons & Ryland, 1989: 414–415, fig. 31A–D; Hirohito, 1995: 183–185, fig. 60a–c; Watson, 2000: 23–24, fig. 18A–F; Preker, 2001: 154; Schuchert, 2003: 181–182, fig. 37A, B.

Description. Large, erect, pinnate, polysiphonic colonies with stiff stems arising from tangled hydrorhizae. Many colonies are connected to each other through distal tendrils of hydrocladia. Stem divided by transverse constrictions,

each internode with alternately-arranged apophyses bearing a hydrocladium held out stiffly at approximately 60–70°, three hydrothecae arranged in a subopposite pair and one in the stem apophysis axis. Hydrocladia alternating and with numerous hydrothecae, nodes rare. Hydrothecae in subopposite pairs, members of the pairs not in contact but slightly overlapping the base of the preceding hydrothecae pairs. Hydrothecae tubular, slender, adnate for most of their adcauline length, then curved outwards with the opening curved slightly downwards. Margin elliptical with three shallow teeth and one-valved operculum attached on the abcauline side of the rim.

Gonothecae in rows on stem and hydrocladia, globular, smooth, and with an aperture on a raised collar.

Colour. Light brown.

Measurements. Internode length 750–1,000 µm. Hydrotheca: length adcauline wall 350–430 µm, diameter at margin 120–125 µm. Gonotheca: length 1,000 µm, maximum width 690–800 µm, diameter at aperture 495–520 µm.

Remarks. Moreton Bay material conforms with the description given by Watson (2000) for *Salacia tetracythara* from northern Australia. This is the first record of the species in the Bay.

Occurrence. Amity Point.

Distribution. Indian and Pacific Oceans, Japan, tropical to temperate coast of Australia.

Sertularella Gray, 1848*Sertularella diaphana* (Allman, 1885)

(Fig. 1B, 2A, B)

Thuiaria diaphana Allman, 1885: 145–146, pl. 18 figs 1–3.

Sertularella diaphana — Bale, 1919: 337–339, pl. 16 fig. 5; Billard, 1925: 157–160, text-fig. 22K–O, pl. 7 figs 12, 13; Pennycuik, 1959: 195; Millard, 1975: 285, fig. 93A–D; Gibbons & Ryland, 1989: 415–417, fig. 32A–E; Calder, 1991: 101–103, fig. 53; Vervoort, 1993: 214–216, figs 45d–e, 46d; Hirohito, 1995: 192, fig. 62b–d, pl. 12 fig. A; Watson, 2000: 31–33, fig. 24A–E; Preker, 2001: 154; Schuchert, 2003: 184–185, fig. 40A–D; Preker & Lawn, 2005: 342.

? *S. diaphana gigantea* — Preker, 1998: 172, unnumbered colour fig.

Material Examined. QM-G331153, Flat Rock, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Colonies variable, from unbranched, to stems with alternate hydrocladia in one plane, reaching 10 cm, lower stem thick and polysiphonic, monosiphonic distally. Stem divided into short internodes by oblique nodes sloping alternately to left and right. Each stem internode bearing one hydrocladium distally on internodes and three hydrothecae: one inferior, one subopposite and one axillary. Hydrocladia with two alternate rows of hydrothecae, divided into internodes by sloping nodes.

Hydrothecae sunken into axis of hydrocladium with only a small section of the adcauline wall free, hydrothecal aperture circular and sloping upwards with four low cusps, operculum consisting of four, thick, triangular flaps, many of which were missing or damaged. Adcauline wall curved and ending in a small thickening of the perisarc at the base; no perisarc floor could be seen. Hydranth with deep, abcauline caecum and with about 15–17 tentacles.

Gonothecae borne on anterior surface of hydrocladia, large and cylindrical, narrowed basally, with longitudinal, undulating lines or folds.

Measurements. Internode lengths: stem 1,200–1,550 μm , hydrocladia 2,500–4,000 μm . Hydrotheca: length adnate adcauline wall 400–520 μm , length free adcauline wall 65–110 μm , diameter at margin 200–230 μm . Gonotheca: length 1,700–2,000 μm , maximum width 600–800 μm .

Remarks. The material from Moreton Bay conforms with the typical form of *Sertularella diaphana* and also, possibly, with *S. diaphana* var. *gigantea*, which forms very large colonies and has thickenings at the lower end of the adcauline, hydrothecal wall (after Billard 1925). As no measurements of hydrothecal lengths and diameters are available for the material described as *S. diaphana* var. *gigantea* by Billard (1925) from the SIBOGA Expedition, we have not attempted to distinguish between the two forms at this point. The type location is Moreton Bay, where a Miss Gatty collected a dry sample which she later gave to Professor Allman for identification (Allman, 1885).

Occurrence. Flat Rock, Shark Gutter, Frenchmans Bay.

Distribution. Type location Moreton Bay. Wide distribution in tropical and subtropical waters of the Indo-Pacific and Atlantic Oceans.

Sertularella minuscula Billard, 1924b
(Fig. 2C, D)

Sertularella minuscula Billard, 1924b: 648, fig. 2F; 1925: 139–140, fig. 9A–C; Leloup, 1932b: 161–162, figs 26, 27; 1935: 45; Pennycuik, 1959: 195, pl. 6 fig. 2; Hirohito, 1974: 18–20, fig. 7a–e; Gibbons & Ryland, 1989: 417–418, fig. 33A–D; Preker, 2001: 154; Watson, 2002: 343–344, fig. 3A–E; Preker, 2005: 48.

Material Examined. QM-G331151, Shag Rock, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Small, erect, monosiphonic colony reaching 7 mm, arising from tubular hydrorhiza creeping on the distal part of some of the larger *S. diaphana* colonies. Stem unbranched, with a short, athecate, basal section, then divided into regular, thecate internodes by oblique nodes sloping alternately left and right. Internodes long and slender, often swollen or annulated at the base. Hydrothecae borne on both hydrorhiza and caulus. The hydrorhizal hydrothecae are irregularly spaced, a few are sessile, but most on short pedicels. The cauline hydrothecae are sessile, one per internode, borne distally and slightly towards the front of the stem. Hydrothecae smooth, cylindrical, narrowing slightly to margin, lower third to half of adcauline wall adnate to internode, upper half curving gently outwards, abcauline wall slightly concave. Margin facing out and up, often with much renovation, with four, distinct cusps separated by deep embayments, operculum of four, very-fragile, triangular valves.

Gonothecae irregular in shape but predominantly obovate, with deep wrinkles, tapering towards a wide pedicel, a small, round mouth located on either a short collar or sunken into the apex of the gonotheca, perisarc thin.

Colour. Pale cream-white.

Measurements. Internode length 240–480 μm . Hydrotheca: length adnate adcauline wall 160–170 μm , length free adcauline wall 160–200 μm , diameter at margin 100–110 μm . Gonotheca: length 950–1,360 μm .

Remarks. The small size and the wrinkled gonothecae make this species easy to identify. Its distribution may have been underestimated, as it is easily overlooked.

Occurrence. Shag Rock.

Distribution. Caribbean, Indian Ocean, Indonesia, Micronesia, Japan, Australia (Qld).

Sertularella quadridens (Bale, 1884)

Thuiaria quadridens Bale, 1884: 119, pl. 7 figs 5, 6; Weltner, 1900: 586, pl. 46 figs 1–3.

Sertularella quadridens – Ritchie, 1910b: 818, text-fig. 79, pl. 77 fig. 12a, b; Stechow & Müller, 1923: 471–472; Bale, 1924: 242; Billard, 1925: 150–151, fig. 19 A, B; Pennycuik, 1959: 195; Mammen, 1965a: 38–39, fig. 70; Watson, 2000: 28–30, fig. 23A–F; Schuchert, 2003: 185–188, fig. 41A–I; Vervoort & Watson, 2003: 171–172.

Description. Erect colonies, pinnate, reaching heights of 45–50 mm. Stem monosiphonic, divided into indistinct internodes, especially in the basal part of the colony. Nodes are oblique and sloping alternately to left and right. Each stem internode bearing a hydrocladial apophysis and three cauline hydrothecae; inferior, axillary and opposite. Hydrocladial internodes with variable number of alternate, well-separated hydrothecae.

Hydrothecae consist of a slightly-swollen tube, curved outwards, adnate almost to the margin, or with a small free portion. Aperture facing slightly upwards, with four marginal cusps. Lower end of adcauline wall forming a perisarc extension projecting into the cavity of the stem or hydrocladia.

Gonothecae not seen.

Measurements. Stem: internode length 1,500–1,760 µm, width at node 335–420 µm. Stem hydrotheca: length adnate adcauline wall 350–435 µm, length free adcauline wall 135–190 µm, diameter at margin 140–190 µm. Hydrocladium: internode length 1,700–1,950 µm, width at node 210–310 µm. Hydrocladial hydrotheca: length adnate adcauline wall 390–450 µm, length free adcauline wall 25–90 µm, diameter at margin 240–290 µm.

Remarks. Pennycuik (1959) reported this hydroid from a number of locations in Moreton Bay. Watson (2000) re-examined the Moreton Bay material and published measurements not

originally provided by Pennycuik. Our Moreton Bay specimens are slightly smaller than the material previously collected from this area but fall within the size range of the species. The basal, adcauline, perisarc spur described by Bale (1884) and Billard (1925) are not equally well developed in our material, varying within the same colony from totally absent, to large projections that almost connect to the opposite hydrotheca.

Occurrence. Amity Point, Peel Island, channel between St. Helena and Mud Islands.

Distribution. Widely distributed throughout the Indo-Pacific, Indonesia, Australia (Queensland, Western Australia).

Sertularella robusta Coughtrey, 1876
(Fig. 2E)

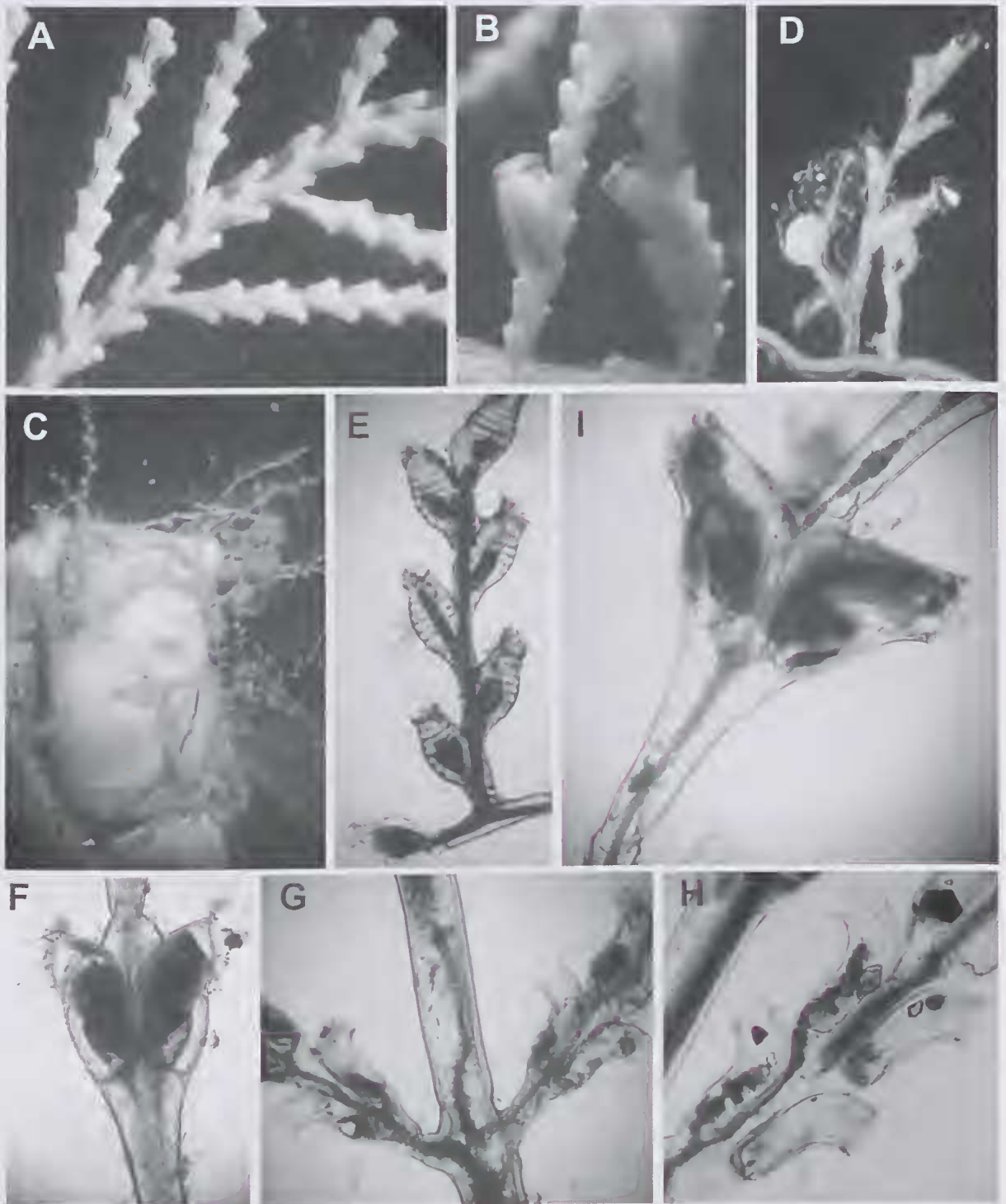
Sertularella robusta Coughtrey, 1876a: 300; Stechow, 1913: 14; Trebilcock, 1928: 16–18, pl. 6 figs 3, 3a–c; Blackburn, 1937a: 367; 1937b: 171–172, fig. 1; Pennycuik, 1959: 195–196, pl. 6 fig. 3; Ralph, 1961a: 824–825, text-fig. 22a–d; Vervoort & Vasseur, 1977: 40–52, figs 18a–c, 19, 20a–c, 21a, b, 22a–c (cum syn.); Hirohito, 1995: 200–201, fig. 65e, f; Vervoort & Watson, 2003: 172–75, fig. 39F.

Material Examined. QM-C331150, Amity, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Small, erect, geniculate colonies arising from tubular hydrorhizae growing on algae. Monosiphonic, branching stem reaching 18 mm in height. Stem and branches divided into internodes by oblique, deeply-constricted nodes, sloping alternately left and right, internodes variable in length. Hydrothecae barrel-shaped, one to each internode, adcauline wall adnate to stem or hydrocaulus for about half its length. Hydrothecae with three to five transverse rings, although they are not equally-well developed on all hydrothecae; margin with four, distinct, blunt, marginal cusps, four opercular valves and three internal vertical teeth. Gonothecae not seen.

Measurements. Internode length 320–500 µm, diameter 120–170 µm. Hydrotheca: length adnate adcauline wall 225–240 µm, length free adcauline wall 250–300 µm, diameter at margin 150–170 µm.

Remarks. The development of the transverse rings on the hydrothecal wall is variable in the



Moreton Bay samples. Some walls are almost smooth while others, on the same colony, can have well-defined rings. This species agrees in many respects with Pennycuik's (1959) material from Myora, and has a wide distribution.

Occurrence. Amity Point, Myora.

Distribution. South Atlantic, Japan, South America, Indonesia, Australia.

Sertularia Linnaeus, 1758

Sertularia borneensis Billard, 1924b

Sertularia borneensis Billard, 1924b: 649, fig. 1D; 1925: 171–173, fig. 31A–D; Pennycuik, 1959: 197, pl. 6 fig. 5; Gibbons & Ryland, 1989: 418–419, fig. 34A–D; Preker, 2001: 154; Schuchert, 2003: 189–190, fig. 43A–C.

Sertularia turbinata — Vervoort & Vasseur, 1977: 60–64, figs 26a, b, 27a, b.

Tridentata borneensis — Kirkendale & Calder, 2003: 176–177.

Description. Colony erect, monosiphonic shoots up to 15 mm, arising from hydrorhizae creeping epiphytically on the calcareous alga *Halimeda* sp. Basal part of hydrocaulus consists of an athecate section of variable length that terminates in an oblique, hinge joint. Subsequent internode separated by weak, sometimes quite-indistinct, straight nodes. Each internode bears a pair of frontally-placed, opposite hydrothecae which are slightly offset. Members of the pairs are nearly always separated frontally but, in some colonies, the distal pairs may be contiguous.

Hydrothecae swollen basally, narrowed above, adnate for about one quarter to half of adcauline length, adnate side curved outwards at angles varying from 75–90°. Margin of hydrothecae tilted slightly upwards, thickened, and with two conspicuous lateral cusps. No

median, adcauline cusps were seen. Adcauline hydrothecal wall elongated into an internal cusp. Hydranth with abcauline caecum.

Gonothecae not seen.

Measurements. Internode length 496–520 µm. Hydrotheca: length adnate adcauline wall 152–160 µm, length free adcauline wall 220–440 µm, diameter at margin 100–110 µm.

Remarks. Only one colony was collected and this was sterile: it was found attached to a piece of *Halimeda* sp. growing among the corals at Flat Rock. There is little doubt, however, that the specimen was *S. borneensis*, as first described by Billard (1924b) and subsequently illustrated by him (Billard 1925) and by Gibbons & Ryland (1989). Vervoort & Vasseur (1977) synonymised this species with *Sertularia turbinata* (Lamouroux, 1816), although their material did not have an abcauline, intrathecal septum, one of the identifying characteristics of *S. turbinata*. They explained its absence as a juvenile feature, an explanation considered to be invalid by Schuchert (2003) as fertile material from Kei Island that he examined also lacked an intrathecal septum as, indeed, did ours from Moreton Bay. We, also, cannot concur with Calder (1991) by placing the Moreton Bay colonies in the genus *Tridentata*, as no median, adcauline cusps were observed and the opposite, hydrothecal pairs were slightly offset. Kirkendale & Calder (2003) did not give a detailed description of their Guam material, hence comparison between their *Tridentata borneensis* and our specimen was not possible. This is the first record of this species from southern Queensland.

Occurrence. Flat Rock.

Distribution. Indonesia, Polynesia, tropical Australia.

FIG. 2. A, B, *Sertularella diaphana* (Allman, 1885), QM-G331153, Flat Rock, Nth Stradbroke I., SE Qld, B shows gonothecae borne on the anterior surface of the hydrocladia; C, D, *Sertularella minuscula* Billard, 1924, QM-G331141, Shag Rock, Nth Stradbroke I., SE Qld, C showing small erect colonies creeping across a dead bivalve, D, showing wrinkled, obovate-shaped gonothecae; E, *Sertularella robusta* Coughtrey, 1876, QM-G331150, Amity Point, Nth Stradbroke I., SE Qld; F, *Sertularia loculosa* Busk, 1852, showing hydranth with a long, leaf-shaped process, the ligula, located on the adcauline side of the hydranth body, QM-G331149, Amity Point, Nth Stradbroke I., SE Qld; G, H, *Synthecium orthogonum* (Busk, 1852), QM-G331154, Flat Rock, Nth Stradbroke I., SE Qld, H showing a magnified view of the hydrothecae showing renovation of the margin from inside the hydrothecae; I, *Tridentata turbinata* (Lamouroux, 1816), showing the abcauline, intrathecal ridge characteristic of this species, QM-G331155, Point Lookout, Nth Stradbroke I., SE Qld.

Sertularia loculosa Busk, 1852

(Fig. 2F)

Sertularia loculosa Busk, 1852: 393–394; Billard, 1926: 512–513; Pennycuik, 1959: 197; Migotto, 1996: 71–73, fig. 13f–i; Schuchert, 2003: 188–189, fig. 42A, B.

Sertularia ligulata — Thornely, 1904: 116–117, pl. 2 figs 1, 1A, B; Billard, 1925: 178–181, fig. 35O–T; Millard, 1975: 307–309, fig. 100A, D; Vervoort & Vasseur, 1977: 53–57, fig. 24a–d; Gibbons & Ryland, 1989: 420–421, fig. 36A–C; Preker, 2001: 154.

Material Examined. QM-G331149, Amity, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Colony erect, monosiphonic, up to 23 mm, mostly unbranched, but two hydrocauli were found that had short branches. Basal, athecate section terminates in oblique hinge-joint, subsequent internodes separated by indistinct nodes. Each internode with a pair of opposite hydrothecae distally on the internode, contiguous in front, separated behind.

Hydrothecae swollen basally, narrowed above, curved outwards but with opening turned slightly downwards, adnate for two-thirds of the adcauline length. Hydrothecae with an intrathecal septum or ridge, aperture margin with two, weak, lateral cusps. Two opercular valves, mostly damaged, the abcauline flap larger than the adcauline. Hydranth with a long, leaf-shaped process, the ligula, located on the adcauline side of the hydranth body, its terminally-swollen tip studded with nematocysts.

Gonothecae not seen.

Measurements. Internode length 660–720 µm. Hydrotheca: length adnate adcauline wall 250–260 µm, length free adcauline wall 120–143 µm, diameter at margin 90–115 µm.

Remarks. The characteristic ligula makes this species readily identifiable. Migotto (1996) describes the rim as having two lateral cusps and a smaller, adcauline cusp: this latter cusp was always inconspicuous in our material. Previously collected from the Myora Banks and Dunwich by Pennycuik (1959).

Occurrence. Amity Point, Myora Banks, Dunwich.

Distribution. Widely distributed over the tropical and subtropical Indian and Pacific Oceans: southern Africa, Japan, Australia

(Queensland, Bass Strait); also found in some regions of the Atlantic Ocean: (western Africa, Brazil).

Tridentata Stechow, 1920*Tridentata distans* (Lamouroux, 1816)

Dynamena distans Lamouroux, 1816: 180, pl. 5 figs 1a, B. *Sertularia distans* — Cornelius, 1979: 296–299, fig. 26a–e; Millard, 1975: 306–307, fig. 93E–H; Medel & Vervoort, 1998: 63–66, figs 6c, 20a, b (cum syn.); Vervoort & Watson, 2003: 184–185.

Sertularia gracilis — Hassall, 1848: 2223.

Sertularia distans var. *gracilis* — Billard, 1925: 175–177, fig. 33H, J, K; Pennycuik, 1959: 197.

Tridentata distans — Calder, 1991: 105–107, fig. 55a–c; Kirkendale & Calder, 2003: 177; Preker & Lawn, 2005: 339, 342.

Material Examined. QM-G331155, Flat Rock, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Colony erect, arising from a creeping hydrorhiza on a piece of alga, monosiphonic, up to 7 mm high. Basal part of hydrocaulus with up to two athecate internodes separated by oblique hinge joints, remainder separated by oblique nodes. Each internode with a distal pair of opposite hydrothecae that are contiguous in front and separated behind.

Hydrothecae tubular, slender, narrowing slightly to margin, distal part facing outwards and slightly upwards. Adcauline hydrothecal wall ending in a small, triangular, perisarc projection into the hydrothecal cavity. Margin with two, well-developed lateral teeth and a small, median, adcauline tooth: the latter may be hard to distinguish in some parts of the colony. Hydranth with an adcauline diverticulum.

Gonothecae not seen.

Measurements. Internode length 900–1,100 µm, diameter at constriction 50–51 µm. Hydrotheca: length adnate adcauline wall 175–180 µm, length free adcauline wall 120–140 µm, diameter at margin 99–110 µm.

Remarks. The Moreton Bay material fits the description of this species given by Calder (1991).

Occurrence. Flat Rock.

Distribution. Circumglobal in temperate, subtropical and tropical waters.

Tridentata turbinata (Lamouroux, 1816)
(Fig. 2I)

Dynamena turbinata Lamouroux, 1816: 180.

Sertularia turbinata — Billard, 1925: 177–178, fig. 34L–N; 1926: 512; Pennycuik, 1959: 198; Millard & Bouillon, 1973: 76, fig. 9H; Millard, 1975: 312–313, fig. 100B, C, E; Vervoort & Vasseur, 1977: 60–64, figs 26a, b, 27a, b; Gibbons & Ryland, 1989: 425, fig. 39A–C; Hirohito, 1995: 218–219, fig. 73d–f; Migotto, 1996: 78–79, fig. 14f, g; Watson, 1997: 521; Medel & Vervoort, 1998: 70–72, fig. 23a–c (cum syn.); Schuchert, 2003: 190–191, fig. 44; Preker, 2005: 48.

Tridentata turbinata — Calder, 1991: 110–112, fig. 60; Preker & Lawn, 2005: 342.

Material Examined. QM-G331156, Point Lookout, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Colony erect, up to 14 mm, arising from a creeping hydrorhiza lacking internal septa. Hydrocaulus monosiphonic, unbranched, divided into internodes by distinct oblique nodes, hinge joint terminating the short, basal, athecate part of stem. Each internode bears a pair of distal, opposite hydrotheca. Hydrothecal pairs separated in the back of the internode, contiguous frontally, tumid, adnate to hydrocaulus for about half their length, outwardly curved above. Hydrothecae with abcauline, intrathecal septum. Perisarc thick, especially near margin. Aperture oval, facing outwards and slightly upwards, with two, pointed lateral cusps and a smaller, median adcauline tooth. Hydranth with an abcauline diverticulum.

Gonothecae borne low on stem on a short pedicel, barrel shaped with 9–10 transverse rings, some raised, and with a wide, collar-shaped distal aperture.

Measurements. Internode length 400–600 µm. Hydrotheca: length adnate adcauline wall 210–234 µm, length free adcauline wall 160–255 µm, diameter at margin 107–116 µm. Gonotheca: height 1,120–1,185 µm, width (maximum) 736–800 µm.

Remarks. A variable species, but the horizontal, abcauline, intrathecal ridge and contiguous, strictly-opposite, hydrothecal pairs help separate it from *S. borneensis* which it resembles. Gonothecae were rare: only four were found out of 900 colonies examined.

Pennycuik (1959) has previously recorded it from both Point Lookout and Dunwich.

Occurrence. Point Lookout, Amity Point, Dunwich.

Distribution. Tropical and subtropical waters.

Family SYNTHECIIDAE
Marktanner-Turneretscher, 1890

Hincksella Billard, 1918

Hincksella cylindrica (Bale, 1888)
(Fig. 1J)

Sertularella cylindrica Bale, 1888: 765–766.

Synthecium cylindricum — Ritchie, 1911: 847–849.

Hincksella cylindrica — Blackburn, 1937b: 173–174, fig. 2; Pennycuik, 1959: 189; Millard, 1975: 232; Watson, 1979: 233; Watson, 2002: 346, 5D.

Material Examined. QM-G331144, Amity, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Colony erect, up to 15 mm, unbranched, divided into internodes by distinct, oblique, alternate sloping nodes, each internode bearing one hydrotheca. Stem with slight corrugations below each hydrotheca, especially in distal part. Hydrothecae alternate, thin-walled, tubular, adnate for one half or more of total length, then bent slightly outwards and upwards. Margin smooth, circular and slightly everted.

Gonothecae arising from within hydrothecae, elongated, club shaped and slightly truncated, but this could have been the result of damage because they were extremely fragile.

Measurements. Internode length 480–592 µm, width at node 192–200 µm. Hydrotheca: length adnate adcauline wall 400–456 µm, length free adcauline wall 320–352 µm, diameter at margin (not including everted edge) 312–336 µm. Gonotheca: height 1,280 µm, width (distal end) 280 µm.

Remarks. The colonies varied from the original description of Bale (1888) in that the stem of the Moreton Bay sample was slightly corrugated. This feature distinguishes *Hincksella corrugata* Millard, 1958, from *H. cylindrica*. As the latter species, however, has not been recorded outside Madagascar and South Africa, and as Millard (1975) comments that *H. corrugata* eventually may prove to be a variety of *H.*

cylindrica, we have identified our colonies as *H. cylindrica* for the time being. Pennycuik (1959) collected a single specimen of this uncommon species from the coral patch at Myora, and Watson (2002) collected it off Palm Beach, Queensland.

Occurrence. Amity Point, Myora.

Distribution. Pacific coast of North America, Caribbean, eastern Australia (NSW, SA, Qld).

Hincksella cylindrica pusilla (Ritchie, 1910b)

Sertularella cylindrica var. *pusilla* Ritchie, 1910b: 817–818, pl. 77 fig. 9.

Syntheicum cylindricum var. *pusilla* — Leloup, 1935: 31–33, fig. 14; 1940: 3, fig. 2.

Hincksella cylindrica var. *pusilla* — Vervoort, 1959: 247–248, fig. 19b, c; Vervoort, 1968: 28–30, pl. 12.

Hincksella cylindrica pusilla — Millard, 1975: 232–234, fig. 76B–D; Calder, 1991: 82–83.

Description. Colony erect, delicate, up to 8 mm, unbranched, divided into internodes by indistinct, oblique, alternate, sloping nodes, each internode bearing one hydrotheca distally. The proximal part of each internode is narrower than the distal part of the same internode and has a small corrugation. Perisarc of basal part of stem thick and slightly twisted, thinning towards distal end; the whole stem is narrower in comparison to the hydrotheca. Hydrothecae large, alternate, with very-thin collapsible walls, adnate to the internode for about one-third to one-quarter of total length, free portion curved away from stem. Margin circular and slightly everted, facing upwards and outwards.

Gonothecae not seen.

Measurements. Internode length 220–360 µm, width at node 60–80 µm. Hydrotheca: length adnate adcauline wall 176–200 µm, length free adcauline wall 216–28 µm, diameter at margin (not including everted edge) 180–216 µm.

Remarks. This specimen was a smaller, more-delicate sample of *Hincksella* and was found among the hydrorhizae of the host hydroid *Idiellana pristis*. *Hincksella cylindrica pusilla* is quite easily distinguished from *H. cylindrica* by its smaller size and its more-delicate hydrothecae that are adnate for only one-third to one-quarter of their total adcauline length. The larger *H. cylindrica*,

however, always had the hydrothecae adnate for at least half of their total adcauline length. The hydrothecae of *H. cylindrica pusilla* bent outwards at a sharper angle than the hydrothecae of *H. cylindrica*. Our specimen conforms, both in size and description, with Ritchie's (1910b) *Sertularella cylindrica* var. *pusilla* from Mergui Archipelago. Locating the gonothecae of the smaller form would help to determine if the two forms are separate species. The present record extends the area of distribution considerably as it has not previously been recorded from Australian waters.

Occurrence. Amity Point.

Distribution. Burma (Mergui Arch.), South Africa, West Indies (Curaçao, Aruba), Japan (Sagami Bay), Australia (Qld; Amity Point).

Syntheicum Allman, 1872

Syntheicum orthogonium (Busk, 1852)

(Fig. 2G, H)

Sertularia orthogonia Busk, 1852: 390; Bale, 1884: 88, pl. 9 fig. 11.

Syntheicum orthogonium — Jäderholm, 1903: 289; Billard, 1910: 25; Jäderholm, 1916: 6; Watson, 2000: 41–42, fig. 32A–F; Schuchert, 2003: 202–203, fig. 54A–E.

Material Examined. QM-G331154, Flat Rock, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Erect, pinnate colony from 13–35 mm, arising from a thick hydrorhiza reptant on the hydroid *Idiellana pristis*. Basal internode athecate, subsequent internodes of variable length, nodes transverse and indistinct, each with a pair of opposite hydrocladia at the distal end of the internodes, and with a pair of opposite hydrothecae proximally. Hydrocladia long and directed slightly upwards, nodes rare or indistinct.

Hydrothecae on hydrocladia in opposite pairs, adcauline walls of pairs separated, consecutive hydrothecae not overlapping. Hydrothecae tubular, adnate for about three-fifths of their vertical height, then curving sharply outwards. Margins of hydrothecae not sinuous, tilted outwards and upwards, slightly everted and often renovated.

Gonothecae arising from within hydrothecae on lower stem, smooth, pedicellate, irregularly

shaped, somewhat flattened, with a small distal aperture, perisarc thin.

Measurements. Internode length 2,080–2,195 μm , width at node 280–340 μm . Hydrotheca: length adnate adcauline wall 400–560 μm , length free adcauline wall 180–240 μm , aperture (not including everted edge) 190–240 μm . Gonotheca: length 1,000 μm , width 490 μm .

Remarks. Identification of the *Synthecium* species from Moreton Bay presented considerable difficulties. Watson (2000) remarked that, even with fertile material, it can be difficult to differentiate between species of *Synthecium* and we found this to be true. The identification of this material as *S. orthogonium*, a tropical species, was largely influenced by the size of the colonies. The dimensions of the hydrothecae also agreed best with those given for this species by Watson (2000) and Schuchert (2003). *Synthecium campylocarpum* Allman, 1888, identified from southern Queensland by Watson (2002), is a very similar species, and, although some authors consider it to be synonymous with *S. orthogonium* (Billard 1925; Rees & Vervoort 1987), Watson (2000) showed that both are distinct species, although separating the two is not a trivial task. The main differences are that *S. campylocarpum* has larger stems, less-curved hydrothecae and a sinuous hydrothecal margin compared with *S. orthogonium*. In our material, unfortunately, these traits showed considerable variation, even within the same colony, but agree best with the dimensions given for *S. orthogonium*. Schuchert (2003) questions if the differences between *S. campylocarpum* and *S. orthogonium* are significant, or if they merely represent intraspecific variations. We found only one gonotheca and the dimensions did not agree well with those given for *S. campylocarpum*, ours being considerably smaller. It was not mature, however, so this may account for its smaller size. Additional fertile material of the two *Synthecium* species needs to be examined to help determine their validity. Furthermore, observations of live material to distinguish between their natural colours may prove a reliable indicator for separating the two species.

Occurrence. Flat Rock.

Distribution. Indonesia, Papua New Guinea, Torres Strait, NT (Darwin Harbour), Qld.

Suborder PROBOSCOIDA Broch, 1910

Family CAMPANULARIIDAE Johnston, 1837

Clytia Lamouroux, 1812

Clytia hemisphaerica (Linnaeus, 1767)

Medusa hemisphaerica Linnaeus, 1767: 1098.

Clytia hemisphaerica — Millard, 1966: 478–480, fig. 14A–F; 1975: 217–218, fig. 72A–D; Cornelius, 1982: 73–82, fig. 9a–m; Gibbons & Ryland, 1989: 402–404, figs 19A–E, 20A–E, 21A–E; Watson, 1994b: 67; Cornelius, 1995b: 252–255, fig. 57A–H; Medel & Vervoort, 2000: 34–38 (cum syn.); Preker, 2001: 154; Kirkendale & Calder, 2003: 172–173; Vervoort & Watson, 2003: 419–420, fig. 103A–C; Preker, 2005: 47; Preker & Lawn, 2005: 344.

Clytia ?hemisphaerica — Watson, 1994a: 151–153, fig. 2A–E.

Clytia johnstoni — Fraser, 1937: 74–75, pl. 15 fig. 71a–d; Ralph, 1957: 823–824, text-figs 1h–u, 3a–f; Mammen, 1965a: 22–23, fig. 51.

Material Examined. QM-G331140, Amity, N. Stradbroke I., SE Qld, M. Preker & I. Lawn, Feb. 2005.

Description. Colony mainly stolonial but sometimes irregularly branched, growing on other hydroids and algae. Pedicels of variable length, annulated proximally and distally, smooth in mid-section. Hydrothecae thin walled, variable in shape from broadly campanulate to deeply campanulate, depth 1–3 times diameter. Margin circular with 10–16 pointed cusps separated by rounded embayments, diaphragm straight and delicate forming a distinct basal chamber, hydrophore small.

Gonothecae borne on short, annulated pedicels arising directly from stolon, variable in shape but elongate-ovoid overall, truncated distally, possessing a wide, terminal aperture with a slight constriction below.

Measurements. Colony height 1.6–6 mm. Hydrotheca: length (diaphragm to rim) 408–720 μm , diameter at rim 128–215 μm . Gonotheca: length 376 μm , width 140 μm .

Remarks. This is recognised as an exceptionally variable species (Cornelius 1982) and the Moreton Bay material is no exception. Very numerous in areas where they are established.

Occurrence. Point Lookout, Amity Point.

Distribution. Circum-global; tropical, subtropical and temperate waters.

Clytia linearis (Thornely, 1899)

Obelia linearis Thornely, 1899: 453, pl. 44 fig. 6.

Campanularia Gravieri: Billard, 1904: 482, fig. 1.

Clytia Gravieri — Billard, 1938: 429–432, figs 1–3.

Clytia gravieri — Millard & Bouillon, 1973: 51–54, fig. 7E–G; Millard, 1975: 215–217, fig. 71F–H.

Clytia linearis — Hirohito, 1977: 14–20, text-fig. 4a–j; Cornelius, 1982: 84–86, fig. 12a–d; Rees & Vervoort, 1987: 94–95; Gibbons & Ryland, 1989: 404–405, fig. 22A–E; Calder, 1991: 62–64, fig. 34a–c; Ramil & Vervoort, 1992: 238, fig. 67b; Hirohito, 1995: 65, fig. 18h, i; Migotto, 1996: 85–87, fig. 16a, b; Medel & Vervoort, 2000: 38–41; Watson, 2000: 73–75, fig. 57D, E; Preker, 2001: 154; Schuchert, 2003: 160–162, fig. 20A–C; Kirkendale & Calder, 2003: 173.

Description. Colonies stolonial, creeping on other hydroids, barnacles, bivalve shells and artificial substrates, such as rubber bands. The Moreton Bay material consists of unbranched pedicels terminating in a hydrotheca. Pedicels either finely ringed throughout, or annulated proximally and distally, with a smooth central portion. Hydrothecae slender, deeply campanulate, with 10–16 long, narrow, sharp, marginal cusps and with internal thickening of the periderm producing a distinct keel. Cusps separated by rounded embayments. Diaphragm delicate, transverse or slightly oblique.

Gonophores borne on an annulated pedicel, club-shaped with a truncated end, perisarc very thin enclosing up to four developing medusae.

Colour. Colony white.

Measurements. Hydrotheca: length (diaphragm to rim) 515–650 μm , diameter at rim 280–330 μm . Gonotheca: length 520 μm , diameter 200 μm .

Remarks. Our specimens agree with the dimensions of *C. linearis* given by Gibbons & Ryland (1989) and Watson (2000). Our material was so frail that most hydrothecae collapsed when handled.

Occurrence. Flat Rock.

Distribution. Tropical to warm-temperate oceans: Fiji, Guam, Kei Islands, Japan, Brazil, Australia.

Obelia Péron and Lesueur, 1810

Obelia bidentata Clark, 1875

Obelia bidentata Clark, 1875: 58, pl. 9 fig. 2; Cornelius, 1975b: 260–265, fig. 2a–c (cum syn.); Gibbons & Ryland, 1989: 405–406, fig. 23A–E; Calder, 1991: 70–72, fig. 37a, b (cum syn.); Cornelius, 1995b: 292–295, fig. 68A–F; Watson, 1996: 78; Medel & Vervoort, 2000: 46–49, fig. 12a–d (cum syn.); Schuchert, 2003: 164–165, fig. 24; Vervoort & Watson, 2003: 424–425.

Description. Small, erect colonies, up to 15 mm high, arising from a tangled mat of stolons anchoring the colony among sponge and the hydroid *Pennaria disticha*. Hydrocaulus sparingly branched, monosiphonic, divided into internodes at regular intervals. Internodes long, slender, annulated basally and above each branch or pedicel. Each internode bears distal, alternate hydrothecae on a short apophysis.

Hydrothecae delicate, deeply campanulate, a little asymmetrical proximally, on short pedicels with 6–12 annulations. Hydrothecal margin with 14–16 big teeth, all with simple, single cusps. Diaphragm delicate and slightly oblique, basal chamber well defined.

Gonothecae on short, annulated pedicels attached to hydrothecal pedicels, ovate in shape and truncated on top. Aperture borne on a short, but distinct, collar.

Measurements. Colony: height 15 mm, internode length 320–510 μm , diameter at node 69–78 μm . Hydrotheca: length (diaphragm to rim) 310–450 μm , diameter at rim 150–240 μm . Gonotheca: length 540 μm , width 225 μm .

Remarks. The Moreton Bay material conforms best with the description of *Obelia longicyatha* by Allman (1877), reported to have a monosiphonic hydrocaulus and single-cusped, marginal teeth separated by deep, rounded incisions. The typical *O. bidentata* has a polysiphonic, lower hydrocaulus with bimucronate, marginal cusps separated by u-shaped incisions. *Obelia longicyatha* Allman, 1877 is, however, considered to be a junior, subjective synonym of *O. bidentata* (Calder, 1991) and our material falls within the range of variations described for *O. bidentata* by Cornelius (1975b). Material without the bimucronate cusps and/or with a monosiphonic hydrocaulus has

previously been identified as *O. bidentata*. Cornelius (1975b) shows a hydrothecal rim with indentations of similar depth from a Nigerian specimen, and Gibbons & Ryland (1989) describe a Fijian specimen with monosiphonic stems. This species has much the same appearance and colony structure as a number of other *Obelia* species and Vervoort & Watson (2003) have suggested that several taxa may be included under the specific name *O. bidentata*. Comparison of the medusae of this species complex does not help in separating one species from the other because they are generally considered to be indistinguishable.

Occurrence. Amity Point.

Distribution. Circumglobal, temperate to tropical.

Obelia dichotoma (Linnaeus, 1758)

Sertularia dichotoma Linnaeus, 1758: 812.

Obelia dichotoma — Leloup, 1932a: 5, fig. 4; Cornelius, 1975b: 265–272, figs 3a, b, 4a–f (cum syn.); Medel & Vervoort, 2000: 49–53, fig. 10c, d (cum syn.); Vervoort & Watson 2003: 425–427, fig. 104A–E.

Obelia australis — von Lendenfeld, 1885a: 920–922, pl. 43 figs 19–22 (descr. medusa); 1885b: 604; Bale, 1888: 753–754, pl. 12 figs 1, 2; Ralph, 1957: 830, fig. 4a–h; Pennycuik, 1959: 170; Mammen, 1965a: 11; Watson 1994b: 66.

Obelia nodosa — Bale, 1924: 230, fig. 1; Ralph, 1957: 832, text-fig. 5i–k; Pennycuik, 1959: 171; Ralph, 1961c: 109.

Obelia angulosa — Bale, 1888: 752–753, pl. 12 fig. 3; Whitelegge, 1889: 195; Watson, 2002: 349–350, fig 7C.

Description. Small colonies, up to 7 mm high, arising from a tubular hydrorhizal network attached to a sponge. Stem monosiphonic, irregularly branched and divided into long internodes that are annulated near their base. Hydrothecae borne on pedicels of variable length, a few annulated throughout, but most have a smooth mid-section. Hydrothecae delicate, campanulate, widening towards the circular aperture, no marginal teeth, diaphragm thin and transverse.

Gonothecae borne on a short, annulated pedicel situated in the axil of the hydrothecal pedicel, about twice as long as the hydrothecae, elongated cone-shape, with a truncated top and a central, tubular aperture.

Colour. Perisarc brown at base of colony, with pale-cream side branches and distal regions.

Measurements. Colony: height 7 mm, internode length 900–1,005 µm, diameter at node 105 µm. Hydrotheca: length (diaphragm to rim) 280–320 µm, diameter at rim 210–315 µm. Gonotheca: length 835 µm, width 220 µm.

Remarks. We follow the revision of Cornelius (1975b, 1995b) in identifying our small, sparingly-branched, monosiphonic colony from Moreton Bay as *O. dichotoma*. The diagnosis of the hydrotheca, pedicel, diaphragm and gonotheca falls well within the range and shape acceptable for this species, which is widely recognised as morphologically variable (Millard 1975; Cornelius 1975b, 1982). The small colony size of our material is its main feature, distinguishing it from the more commonly known growth form which forms a large, erect, bushy, polysiphonic colony to 350 mm. Pennycuik (1959) and Watson (2002) have previously reported similar, small *Obelia* colonies from southeast Queensland: *Obelia nodosa* Bale, 1924 was reported from Scott's Point by Pennycuik, and *Obelia angulosa* Bale, 1888 was found off Palm Beach by Watson (2002). Watson (2002) states that *O. angulosa* is easily distinguished from *O. dichotoma* by its smaller size and transverse diaphragm. Cornelius (1975b), however, considers both these species to be synonyms of *O. dichotoma*, and he shows, quite clearly, that a small, monosiphonic colony that almost never branched is characteristic of colonies from wave- and current-swept habitats. Leloup (1932a) also shows a small colony of *O. dichotoma* in his fig. 4. Vervoort & Watson (2003) point out that, in New Zealand specimens, transverse and oblique diaphragms of *O. dichotoma* are of approximately equal occurrence and that a structurally-oblique diaphragm may appear transverse under certain angles of observation. There does not appear to be any obvious way to separate small colonies of *O. dichotoma* from *O. angulosa* and *O. nodosa*, therefore, and we have, consequently, followed Cornelius (1975b, 1982, 1995b) in regarding them as conspecific, at least for the time being.

Occurrence. Point Lookout.

Distribution. Cosmopolitan, widespread in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. Medel & Vervoort (2000) provide a comprehensive distribution list.

RESULTS AND DISCUSSION

As a result of the collections made during this workshop, 44 species of hydroids from 14 families have been identified. Owing to the limited time available to us in examining all of the collected material, it is probable that there are several more species that we have not listed here. Notwithstanding the tentative identifications of some of the specimens due to the lack of fertile material, we suggest that thirteen species are new to the southeast Queensland region and one, *Hincksella cylindrica pusilla* (Ritchie, 1910b), is new to Australian waters. When we combine our collection with those of others for this area, it brings the list of the hydroid fauna for the region to 74 species in 18 families (see Table 2). Twenty-five of the species from our collection have a tropical or subtropical distribution, and only two species, *Opercularella humilis* (Bale, 1924) and *Hincksella cylindrica* (Bale, 1888), have a predominantly temperate distribution.

This paper should not be regarded as a complete listing of the hydroid species for this area. Much of our collected material still needs to be worked through and some species remain unidentified. Our collection also contains a small colony of a specimen from the Family Tubulariidae that could not be matched with any known species and would, thus, appear to be undescribed. Further collections, especially from subtidal and estuarine areas, will undoubtedly increase the number of hydroid species from this region. We regard our anthoathecate fauna list to be especially depauperate and many of the samples remain unidentified to date. This is owing to the fact that accurate identification of many of the anthoathecates is dependent upon the presence of mature reproductive structures, a particular problem in immature colonies where such material is absent. Further collection of specimens at different seasons of the year may serve to ameliorate this problem.

ACKNOWLEDGEMENTS

We thank the organisers of The Thirteenth International Marine Biological Workshop (Peter Davie, Julie Phillips, Ian Brown, Ian Tibbetts and Svea Mara Wolkenhauer) for

making this survey possible. In particular, we would like to make special mention of Peter Davie, of the Queensland Museum, whose tireless work, enthusiasm and support 'behind the scenes' made everything run smoothly during the period of the workshop, and whose gentle reminders of deadlines have brought the workshop publications to fruition. We would also like to thank the other participants in the workshop who provided help with collection (Andrea Crowther, Daphne Fautin, Carden Wallace, Michela Mitchell, Lisa-ann Gershwin, Peter Davie, Julie Phillips, and Anne-Nina Lörz). Thanks are also due to John Markham, who proved a willing and reliable dive buddy on many of our dives, and to Ian Brown who organised the use of the trawler. Finally, we thank the staff of the Moreton Bay Research Station for provision of facilities, and the library staff of The University of Queensland, who helped track down some of the more obscure and difficult-to-obtain articles necessary to complete our literature review.

LITERATURE CITED

- Agassiz, A.E.R. 1865. *North American Acalephae*. Vol. 1. (Sever & Francis: Cambridge, Massachusetts).
- Agassiz, L. 1862. *Contributions to the Natural History of the United States of America*. Second monograph. Vol. 4. (Little, Brown & Co.: Boston).
- Allman, G.J. 1872. *A monograph of the gymnoblastic or tubularian hydroids. Conclusion of Part I, and Part II, containing descriptions of the genera and species of the Gymnoblastea*. (The Ray Society: London).
1877. Report on the Hydroida collected during the exploration of the Gulf Stream by L.F. de Pourtales, Assistant United States Coast Survey. *Memoirs of the Museum of Comparative Zoölogy at Harvard College* 5: 1-66, pls 1-34.
1885. Description of Australian, Cape and other Hydroida, mostly new, from the Collection of Miss H. Gatty. *Journal of the Linnean Society. Zoology* 19: 132-161, pls 7-26.
1888. Report on the Hydroida dredged by H.M.S. Challenger during the years 1873-76. Part II. The Tubularinae, Corymorphinae, Campanularinae, Sertularinae and Thalamophora. Pp. i-lxix, 1-90, pls 1-39. *In*, Report on the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873-76. Zoology 70, Vol. 23. (Her Majesty's Stationery Office: London).

Table 2. A summary of the hydroids collected from Moreton Bay and adjacent regions, extending from Caloundra Heads to the New South Wales border (latitudes 22°–26°S). '<P' = earlier collections cited by Pennycuik (1959).

	Hydroids Collected	Within Moreton Bay	SE Qld, outside Moreton Bay
Order ANTHOATHECATAE			
Suborder FILIFERA			
Bougainvilliidae	<i>Bimeria australis</i>	Pennycuik (1959)	
	<i>Bimeria currumbinensis</i>		Pennycuik (1959)
	<i>Garveia clevelandensis</i>		Pennycuik (1959)
	<i>Rhizorhagium areuosum</i> (?)		Pennycuik (1959)
Eudendriidae	<i>Eudendrium currumbense</i>		Pennycuik (1959)
	<i>Eudendrium ?glomeratum</i>		Watson (2002)
	<i>Eudendrium pennycuikae</i>	this work	
Clavidae	<i>Cordylophora caspia</i>	Pennycuik (1959)	
Pandeidae	<i>Leuckartiara octona</i>	Pennycuik (1959)	
Suborder CAPITATA			
Pennariidae	Pennariidae unident		Pennycuik (1959)
	<i>Pennaria disticha</i>	Pennycuik (1959), this work	Pennycuik (1959), Preker (1998), this work
Porpitidae	<i>Porpita porpita</i>	Preker (1998)	Preker (1998)
	<i>Velella velella</i>	Preker (1998)	Preker (1998)
Solanderiidae	<i>Solanderia secunda</i>		this work
	<i>Solanderia fusca</i> ?		Preker (1998)
Tubulariidae	<i>Ectopleura crocca</i>	Pennycuik (1959), this work	
	<i>Tubularia</i> sp.	Preker (1998)	
Order LEPTOTHECATAE			
Suborder CONICA			
Aglaopheniidae	<i>Aglaophenia sinuosa</i>		Watson (2002)
	<i>Lytocarpia brevirostris</i>		Watson (2002)
	<i>Macrorhynchia philippina</i>	<P, Pennycuik (1959), Preker (1998), this work	this work, Watson (2002)
	<i>Macrorhynchia phoenicea</i>	Pennycuik (1959)	Preker (1998), this work
Campanulinidae	<i>Lafodia amiranteusis</i>	this work	
	<i>Opercularella humilis</i>	this work	Pennycuik (1959)
Haleciidae	<i>Halecium delicatulum</i>		Pennycuik (1959), this work
	<i>Halecium sessile</i>	this work	Watson (2002)
	<i>Halecium tenellum</i>		this work
	<i>Halecium</i> sp.		Watson (2002)
continued ...			

Table 2 (continued) ...

	Hydroids Collected	Within Moreton Bay	SE Qld, outside Moreton Bay
Haleciidae (cont.)	<i>Hydrodendron daidalum</i>		Watson (2002)
	<i>Hydrodendron mirabile</i>	this work	
	<i>Nemalécium lighti</i>	Pennycuik (1959), this work	
Halopterididae	<i>Antennella secundaria</i>	Pennycuik (1959)	Watson (2002), this work
	<i>Halopteris diaphana</i>		Preker (1998)
	<i>Halopteris polymorpha</i>		Watson (2002), this work
Hebellidae	<i>Anthohebella parasitica</i>	this work	
	<i>Hebella contorta</i>		Pennycuik (1959)
	<i>Hebelopsis costata</i>	<P, Pennycuik (1959), this work	
	<i>Hebelopsis scandens</i>	Pennycuik (1959), this work	Watson (2002)
Lafoeidae	<i>Filellum serratum</i>		this work
Plumulariidae	<i>Plumularia badia</i>	Pennycuik (1959)	
	<i>Plumularia setacea</i>	Pennycuik (1959), this work	Pennycuik (1959), this work
	<i>Plumularia warreni</i>		Pennycuik (1959)
	<i>Plumularia warreni pambanensis</i>	Pennycuik (1959)	
	<i>Plumularia</i> sp.		Preker (1998)
Sertulariidae	<i>Amphisbetia minima</i>	Pennycuik (1959)	Pennycuik (1959)
	<i>Calamphora campanulata</i>		this work
	<i>Diphasia digitalis</i>	Pennycuik (1959), this work	
	<i>Diphasia mutulata</i>		this work
	<i>Dynamena disticha</i>	Pennycuik (1959)	
	<i>Dynamena crisioides</i>	<P, Pennycuik (1959), this work	Pennycuik (1959), this work
	<i>Dynamena gibbosa</i>	Pennycuik (1959)	
	<i>Dynamena obliqua</i>	Pennycuik (1959)	Pennycuik (1959)
	<i>Dynamena quadridentata</i>		Watson (2002), this work
	<i>Idiellana pristis</i>	<P, Pennycuik (1959), this work	this work
	<i>Salacia desmoides</i>		Watson (2002), this work
	<i>Salacia hexodon</i>	<P, this work	

Continued ...

Table 2 (continued) ...

	Hydroids Collected	Within Moreton Bay	SE Qld, outside Moreton Bay
Sertulariidae (cont.)	<i>Salacia tetracythara</i>	<P, Pennycuik (1959), this work	
	<i>Sertularella diaphana</i>	<P, Pennycuik (1959), this work	this work
	<i>Sertularella diaphana gigantea</i>	Preker (1998)	
	<i>Sertularella minuscula</i>		Watson (2002), this work
	<i>Sertularella quadridens</i>	<P, Pennycuik (1959), this work	
	<i>Sertularella robusta</i>	Pennycuik (1959), this work	
	<i>Sertularia borneensis</i>		this work
	<i>Sertularia loculosa</i>	Pennycuik (1959), this work	
	<i>Symplectoscyphus sibogae</i>		Watson (2002)
	<i>Tridentata distans</i>		this work
	<i>Tridentata turbinata</i>	Pennycuik (1959), this work	Pennycuik (1959), this work
Syntheciidae	<i>Hincksella cylindrica</i>	Pennycuik (1959), this work	Watson (2002)
	<i>Hincksella cylindrica pusilla</i>	this work	
	<i>Synthecium campylocarpum</i>		Watson (2002)
	<i>Synthecium orthogonium</i>		this work
	<i>Synthecium patulum</i>	Pennycuik (1959)	
Suborder PROBOSCOIDA			
Campanulariidae	<i>Clytia hemisphaerica</i>	this work	Pennycuik (1959), this work
	<i>Clytia linearis</i>		this work
	<i>Obelia angulosa</i>		Watson (2002)
	<i>Obelia bidentata</i>	Pennycuik (1959), this work	
	<i>Obelia dichotoma</i>	Pennycuik (1959),	Pennycuik (1959), this work
	<i>Obelia longicyathia</i>	Pennycuik (1959)	
	<i>Orthopyxis integra</i>	Pennycuik (1959)	Pennycuik (1959)
	<i>Orthopyxis crenata subtropica</i>	Pennycuik (1959)	
	<i>Orthopyxis delicata</i>		Pennycuik (1959)

- Bale, W.M. 1884. *Catalogue of the Australian Hydroid Zoophytes*. (Australian Museum: Sydney).
1888. On some new and rare Hydroids in the Australian Museum collection. *Proceedings of the Linnean Society of New South Wales* (Series 2) **3**: 745–799, pls 12–21.
1913. Further notes on Australian hydroids. II. *Proceedings of the Royal Society of Victoria* (New Series) **26**: 114–147, pls 12–13.
1919. Further notes on Australian hydroids. IV. *Proceedings of the Royal Society of Victoria* (New Series) **31**: 327–361, pls 16–17.
1924. Report on some hydroids from the New Zealand coast, with notes on New Zealand Hydroids generally, supplementing Farquhar's list. *Transactions and Proceedings of the New Zealand Institute* **55**: 225–268.
- Billard, A. 1904. Hydroïdes récoltés par M. Ch. Gravier dans le Golfe de Tadjourah. *Bulletin du Muséum d'Histoire naturelle* **10**: 480–485.
1910. Revision d'une partie de la collection des Hydroïdes du British Museum. *Annales des Sciences naturelles, Zoologie* (9e Série) **11**: 1–67.
1913. Les hydroïdes de l'expédition du Siboga. I. Plumulariidae. *Siboga-Expeditie, Monografie* **7a**: 1–115, pls 1–6.
1918. Notes sur quelques espèces d'Hydroïdes de l'expédition du "Siboga". *Archives de Zoologie Expérimentale et Générale* **57**: 21–27.
- 1924a. Note critique sur divers genres et espèces d'hydroïdes avec la description de trois espèces nouvelles. *Revue Suisse de Zoologie* **31**: 53–74.
- 1924b. Note sur quelques espèces la plupart nouvelles de synthecides et de sertularides du "Siboga". *Bulletin de la Société Zoologique de France* **49**: 646–652.
1925. Les hydroïdes de l'expédition du Siboga. II. Synthecidae et Sertularidae. *Siboga-Expeditie, Monografie* **7b**: 117–232, pls 7–9.
1926. Question de synonymie (*Sertularia turbinata*, *S. loculosa*, *S. ligulata*). *Bulletin de la Société Zoologique de France* **51**: 512–513.
1927. Les hydroïdes de la côte Atlantique de France. *Comptes rendus du Congrès des Sociétés savantes en 1926, Sciences*: 326–346.
1933. Les hydroïdes des golfes de Suez et d'Akaba. *Mémoires de l'Institut d'Égypte* **21**: 1–30, pl 1.
1938. Note sur une espèce de Campanulariides (*Clytia gravieri*, Billard). *Bulletin du Muséum national d'Histoire naturelle* (2 me série) **10**: 429–432.
1941. Note sur les hydroïdes: *Hebella costata* (Bale) et *H. corrugata* (Thornely). *Bulletin de la Société Zoologique de France* **66**: 13–15.
- Blackburn, M. 1937a. Lady Percy Island. 1935 Expedition. Reports of the expedition of the McCoy Society for Field Investigation and Research. 11. Coelenterata. *Proceedings of the Royal Society of Victoria* (New Series) **49**: 364–371.
- 1937b. Notes on Australian Hydrozoa, with descriptions of two new species. *Proceedings of the Royal Society of Victoria* (New Series) **50**: 170–181.
1938. Sir Joseph Banks Islands. Reports of the expedition of the McCoy Society for Field Investigation and Research. Part I. 3. Hydrozoa. *Proceedings of the Royal Society of Victoria* (New Series) **50**: 312–328.
1942. A systematic list of the Hydroids of South Australia with a summary of their distribution in other seas. *Transactions of the Royal Society of South Australia*. **66**: 104–118.
- Boero, F. 1980a. *Hebella parasitica* (Cnidaria, Hydroida): a thecate polyp producing an Anthomedusa. *Marine Biology* **59**: 133–136.
- 1980b. Life cycles of hydroids and hydromedusae: some cases of difficult interpretation. *Memorie di Biologia Marina e di Oceanografia* **10** (Suppl.): 141–147.
- Boero, F. & Bouillon, J. 1993. Zoogeography and life cycle patterns of Mediterranean hydromedusae (Cnidaria). *Biological Journal of the Linnean Society* **48**: 239–266.
- Boero, F., Bouillon, J. & Kubota, S. 1997. The medusae of some species of *Hebella* Allman, 1888, and *Anthohebella* gen. nov. (Cnidaria, Hydrozoa, Lafoeidae), with a world synopsis of species. *Zoologische Verhandlungen* **310**: 1–53.
- Bouillon, J. 1984. Révision de la famille des Phialuciidae (Kramp, 1955) (Leptomedusae, Hydrozoa, Cnidaria), avec un essai de classification des Thecatae-Leptomedusae. *Indo-Malayan Zoology* **1**: 1–24.
1986. *Nemalecium* gen. nov., genre nouveau de Haleciidae (Thecatae-Leptomedusae, Hydrozoa, Cnidaria). *Indo-Malayan Zoology* **3**: 71–80.
- Bouillon, J., Boero, F. & Gravier-Bonnet, N. 1986. Pseudostenotele, a new type of nematocyst, and its phylogenetic meaning within the Haleciidae (Cnidaria, Hydrozoa). *Indo-Malayan Zoology* **3**: 63–69, pls 1–2.
- Bouillon, J., Massin, C. & Krešević, R. 1995. Hydroidomedusae de l'Institut Royal des Sciences naturelles de Belgique. *Documents de Travail de l'Institut Royal des Sciences Naturelles de Belgique* **78**: 3–106.
- Bouillon, J., Wouters, K. & Boero, F. 1992. Etude des Solanderiidae de la Baie de Hansa (Papouasie Nouvelle-Guinée) avec une révision du genre *Solanderia* (Cnidaria, Hydrozoa). *Bulletin de*

- l'Institut Royal des Sciences Naturelles de Belgique, *Biologie* 62: 5–33.
- Bouillon, J., Medel, M.D., Pagès, F., Gili, J.-M., Boero, F. & Gravili, C. 2004. *Fauna of the Mediterranean Hydrozoa*. *Scientia Marina* 68: 1–449.
- Briggs, E.A. 1918. Descriptions of two new hydroids, and a revision of the hydroid-fauna of Lord Howe Island. *Records of the Australian Museum* 12: 27–47, pls 5–6.
- Briggs, E.A. & Gardner, V.E. 1931. Hydroida. Pp. 181–196, pl 1. In, *Great Barrier Reef Expedition 1928–29. Scientific Reports*. Vol. 4(6). (Printed by order of the Trustees of the British Museum: London).
- Brinckmann-Voss, A. 1970. Anthomedusae/Athecatae (Hydrozoa, Cnidaria) of the Mediterranean. Part I. Capitata. *Fauna e Flora del Golfo di Napoli* 39: 1–96.
- Broch, H. 1910. Die Hydroiden der arktischen Meere. Pp. 127–248, pls 2–4. In, Römer, F. & Schaudinn, F. (Eds), *Fauna Arctica*. (G. Fischer: Jena).
- Busk, G. 1852. An account of the Polyzoa, and sertularian zoophytes, collected in the voyage of the Rattlesnake, on the coasts of Australia and the Louisiade Archipelago, &c. Pp. 343–402, pl 1. In, Macgillivray, J. (Ed.), *Narrative of the voyage of H.M.S. Rattlesnake, commanded by the late Captain Owen Stanley, R.N., F.R.S., &c. during the years 1846–1850*. (T. & W. Boone: London).
- Calder, D.R. 1988. Shallow-water hydroids of Bermuda: the Athecatae. *Royal Ontario Museum. Life Sciences Contributions* 148: i–iv, 1–107.
1991. Shallow-water hydroids of Bermuda: the Thecatae, exclusive of Plumularioidea. *Royal Ontario Museum. Life Sciences Contributions* 154: i–iv, 1–140.
1997. Shallow-water hydroids of Bermuda: superfamily Plumularioidea. *Royal Ontario Museum. Life Sciences Contributions* 161: 1–85.
- Ciamician, J. 1880. Ueber *Lafoëa parasitica* n. sp. *Zeitschrift für Wissenschaftliche Zoologie* 33: 673–676, pl 39.
- Clark, S.F. 1875. Descriptions of new and rare species of hydroids from the New England coast. *Transactions of the Connecticut Academy of Sciences* 3: 58–66, pls 9–10.
- Clarke, S.F. 1879. Report on the Hydroida collected during the exploration of the Gulf Stream and Gulf of Mexico by Alexander Agassiz, 1877–78. *Bulletin of the Museum of Comparative Zoölogy at Harvard College* 5: 239–252, pls 1–5.
- Cornelius, P.F.S. 1975a. A revision of the species of Lafoeidae and Haleciidae (Coelenterata: Hydroida) recorded from Britain and nearby seas. *Bulletin of the British Museum (Natural History). Zoology Series* 28: 375–426.
- 1975b. The hydroid species of *Obelia* (Coelenterata, Hydrozoa: Campanulariidae), with notes on the medusa stage. *Bulletin of the British Museum (Natural History) (Zoology Series)* 28: 249–293.
1979. A revision of the species of Sertulariidae (Coelenterata: Hydroida) recorded from Britain and nearby seas. *Bulletin of the British Museum (Natural History) (Zoology Series)* 34: 243–321.
1982. Hydroids and medusae of the family Campanulariidae recorded from the eastern North Atlantic, with a world synopsis of genera. *Bulletin of the British Museum (Natural History) (Zoology Series)* 42: 37–148.
1992. Medusa loss in leptolid Hydrozoa (Cnidaria), hydroid rafting, and abbreviated life-cycles among their remote-island faunas: an interim review. *Scientia Marina* 56: 245–261.
- 1995a. North-West European thecate hydroids and their medusae. Part 1. Introduction, Laodiceidae to Haleciidae. Vol. 50. (Field Studies Council: Shrewsbury).
- 1995b. North-West European thecate hydroids and their medusae. Part 2. Sertulariidae to Campanulariidae. Vol. 50. (Field Studies Council: Shrewsbury).
- Cotton, B.C. & Godfrey, F.K. 1942. *Idiellana*, a new name for the preoccupied genus *Idiella* Stechow (Coelenterata – Family Sertulariidae). *Records of the South Australian Museum* 7: 234.
- Coughtrey, M. 1876a. Critical notes on the New Zealand Hydroida. *Transactions and Proceedings of the New Zealand Institute* 8: 298–302.
- 1876b. Critical notes on the New Zealand Hydroida, suborder Thecaphora. *Annals and Magazine of Natural History (Series 4)* 17: 22–32, pl 3.
- Davie, P.J.F. & Hooper, J.N.A. 1994. The Queensland Museum and marine studies in Moreton Bay. Pp. 105–112. In, Greenwood, J.G. & Hall, N.J. (Eds), *Future Marine Science in Moreton Bay* (School of Marine Science, University of Queensland: Brisbane).
- Dawson, E.W. 1992. The Coelenterata of the New Zealand region: a handlist for curators, students and ecologists. *Papers of the Hutton Foundation, New Zealand* 1: 1–68.
- Duchassaing, P. & Michelin, H. 1846. Note sur deux Polypiers de la famille des Coraux, appartenant aux genres *Solanderia* et *Pterogorgia*. *Revue Zoologique* 9: 218–220.
- Ehrenberg, C.G. 1834. Beiträge zur physiologischen Kenntniss der Corallienthiere im allgemeinen und besonders des rothen Meeres, nebst einem Versuch zur physiologischen Systematik derselben.

- Abhandlungen der Königl. Akademie der Wissenschaften zu Berlin (1832) 1: 225–380.
- Ellis, J. 1755. *An essay towards a natural history of the corallines, and other marine productions of the like kind, commonly found on the coasts of Great Britain and Ireland. To which is added the description of a large marine polype taken near the North Pole, by the whale fishers, in the summer 1753.* (Printed for the author: London).
- Ellis, J. & Solander, D. 1786. *The natural history of many curious and uncommon zoophytes, collected from various parts of the globe.* (Benjamin White & Son and Peter Elmsly: London).
- Fleming, J. 1828. *A history of British animals.* (Bell and Bradfute: Edinburgh).
- Fraser, C.M. 1911. The hydroids of the west coast of North America. With special reference to those of the Vancouver Island region. *Bulletin from the Laboratories of Natural History of the State University of Iowa* 6: 1–91, pls 1–8.
1912. Some hydroids of Beaufort, North Carolina. *Bulletin of the Bureau of Fisheries, Washington* 30: 337–387.
1937. *Hydroids of the Pacific coast of Canada and the United States.* (The University of Toronto Press: Toronto).
1938. Hydroids of the 1934 Allan Hancock Pacific Expedition. *Allan Hancock Pacific Expeditions* 4: 1–105, pls 1–15.
- García Corrales, P., Aguirre Inchaurre, A. & González Mora, D. 1978. Contribución al conocimiento de los hidrozoos de las costas españolas. Parte I: Halécidos, Campanuláridos y Plumuláridos. *Boletín del Instituto Español de Oceanografía* 4: 3–73.
- Gibbons, M.J. & Ryland, J.S. 1989. Intertidal and shallow water hydroids from Fiji. I. Athecata to Sertulariidae. *Memoirs of the Queensland Museum* 27: 377–432.
- Gmelin, J.F. 1791. Classis VI. Vermes. Pp. 3021–3910. In: Gmelin, J.F. (Ed.), *Caroli a Linné. Systema Naturae. Editio decima tertia, aucta reformata. Tom. I. Pars VI.* (G.E. Beer: Lipsiae (Leipzig)).
- Goldfuss, G.A. 1820. Handbuch der Zoologie. Abtheilung 1. P. 89. In: Schubert, G.H. (Ed.), *Handbuch der Naturgeschichte zum Gebrauch bei Vorlesungen.* (J.L. Schrag: Nürnberg).
- Gray, J.E. 1848. *List of the specimens of British animals in the collection of the British Museum. Part 1. Centroniae or radiated animals.* (Trustees of the British Museum: London).
1868. Notes on the Ceratelladae, a family of keratose sponges. *Proceedings of the Zoological Society of London* 1868: 575–579.
- Hadzi, J. 1913. Poredbena hidroidska istrazivanja. I. *Hebella parasitica* (Ciamician). (S dodatkom: *Hebellopsis brocii* g. et sp. n. i *Hebella* (?) *gigas* Pieper). *Rad Jugoslavenske Akademije Znanosti i Umjetnosti u Zagrebu* 198: 105–210.
- Hargitt, C.W. 1924. Hydroids of the Philippine Islands. *The Philippine Journal of Science* 24: 467–507, pls 1–6.
- Hassall, A.H. 1848. Definitions of three new British zoophytes. *Zoologist* 6: 2223.
- Hincks, T. 1861. A catalogue of the zoophytes of South Devon and South Cornwall. *Annals and Magazine of Natural History (Series 3)* 8: 152–161, 251–262, 290–297, 360–366, pls 6–8.
1866. On new British Hydroida. *Annals and Magazine of Natural History (Series 3)* 18: 296–299.
1868. *A History of the British Hydroid Zoophytes.* (John van Voorst: London).
1874. On deep-water Hydroida from Iceland. *Annals and Magazine of Natural History (Series 4)* 13: 146–153, pls 6–8.
- Hirohito, Emperor of Japan. 1969. Some hydroids of the Amakusa Islands. *Publications of the Biological Laboratory, Imperial Household, Tokyo* 1969/9: i–iv, 1–32, map.
1974. Some hydrozoans of the Bonin Islands. *Publications of the Biological Laboratory, Imperial Household, Tokyo* 1974/11: i–iii, 1–55.
1977. Five hydroid species from the Gulf of Aqaba, Red Sea. *Publications of the Biological Laboratory, Imperial Household, Tokyo* 1977/11: i–ii, 1–26, frontispiece, pls 1–3.
1988. The hydroids of Sagami Bay. I. Athecata. *Publications of the Biological Laboratory, Imperial Household, Tokyo* 1988: i–ii, 1–179, 2 maps, pls 1–4.
1995. The hydroids of Sagami Bay. II. Thecata. *Publications of the Biological Laboratory, Imperial Household, Tokyo* 1995: i–iii, 1–355, frontispiece, 2 maps, pls 1–13. Edited and annotated by M. Yamada.
- Inaba, M. 1892. Soshu, Miura, Misaki ni oide edaru Hydroidea. [Hydroids collected at Miura and Misaki in Soshu]. [In Japanese]. *Zoological magazine, Tokyo* 4: 93–101, 124–131.
- Jäderholm, E. 1903. Aussereuropäische Hydroiden im schwedischen Reichsmuseum. *Arkiv för Zoologi* 1: 259–312, pls 12–15.
1916. Results of Dr. E. Mjöberg's Swedish Scientific Expeditions to Australia, 1910–13. XII. Hydroiden. *Kungliga Svenska Vetenskapsakademiens Handlingar* 52: 1–9.
1919. Zur Kenntnis der Hydroidenfauna Japans. *Arkiv för Zoologi* 12: 1–34, pls 1–6.

1923. Notes on hydroids from the Great Ocean. *Meddelanden från Göteborgs Musei Zoologiska Avdelning* 27: 1-6.
1926. Über einige antarktische und subantarktische Hydroiden. *Arkiv för Zoologi* 18: 1-7.
- Jarvis, F.E. 1922. The hydroids from the Chagos, Seychelles and other islands and from the coasts of British East Africa and Zanzibar. *Transactions of the Linnean Society of London (Zoology)* 18: 331-360, pls 24-26.
- Johnston, G. 1837. A catalogue of the zoophytes of Berwickshire. *History of the Berwickshire Naturalists' Club* 1: 107-108.
- Kirchenpauer, G.H. 1872. Ueber die Hydroidenfamilie Plumularidae, einzelne Gruppen derselben und ihre Fruchtbehälter. I. *Aglaophenia* Lx. *Abhandlungen aus dem Gebiete der Naturwissenschaften, Hamburg* 5: 1-58, pls 1-8.
- Kirkendale, L. & Calder, D.R. 2003. Hydroids (Cnidaria: Hydrozoa) from Guam and the Commonwealth of the Northern Marianas Islands (CNMI). *Micronesica* 35-36: 159-188.
- Kirkpatrick, R. 1890. Reports on the zoological collections made in Torres Straits by Professor A.C. Haddon, 1888-1889. Hydroida and Polyzoa. *Scientific Proceedings of the Royal Dublin Society (new series)* 6: 603-626, pls 14-17.
- Kramp, P.L. 1959. Some new and little-known Indo-Pacific medusae. *Videnskabelige Meddelelser. Dansk Naturhistorisk Forening i København* 121: 223-259.
- Kühn, A. 1913. Entwicklungsgeschichte und Verwandtschaftsbeziehungen der Hydrozoen. I Teil: Die Hydroiden. *Ergebnisse und Fortschritte der Zoologie* 4: 1-284.
- Lamarck, J.-B.P.A. 1816. *Histoire naturelle des animaux sans vertèbres*. Vol. 2. (Verdi re: Paris).
- Lamouroux, J.V.F. 1812. Extrait d'un mémoire sur la classification des Polypiers corallig nes non entièrement pierreux. *Nouveau Bulletin des Sciences par la Société Philomatique de Paris* 3: 181-188.
1816. *Histoire des polypiers corallig nes flexibles, vulgairement nommés zoophytes*. (Poisson: Caen).
1824. (Description des polypiers flexibles). *Zoologie, par J.R.C. Quoy et J.P. Gaimard*. Pp. 603-693. In, *Voyage autour du Monde entrepris par ordre du Roi, sous le Ministère et conformément aux instructions de M. le Vicomte Du Bouclage, secrétaire de l'Etat au département de la Marine, exécuté sur les Corvettes de S.M. l'Uranie et la Physicienne, pendant les années 1817, 1818, 1819 et 1820, par M. Louis de Freycinet*. (Pillet Aîné: Paris).
- Leloup, E. 1932a. Contributions a l'étude de la faune Belge. II. - Vie pélagique temporaire chez certains hydropolypes du genre *Obelia*. *Bulletin du Musée Royal d'Histoire Naturelle de Belgique* 8: 1-7.
- 1932b. Une collection d'hydropolypes appartenant à l'Indian Museum de Calcutta. *Records of the Indian Museum* 34: 131-170, pls 16-17.
1935. Hydraires calyptoblastiques des Indes occidentales. *Mémoires du Musée Royal d'Histoire Naturelle de Belgique (Série 2)* 2: 1-73.
1940. Quelques hydropolypes de la Baie de Sagami, Japon. (2e note). *Bulletin du Musée Royal d'Histoire Naturelle de Belgique* 16: 1-13.
- Linnaeus, C. 1758. *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species cum characteribus, differentiis, synonymis, locis. Editio decima, reformata*. Vol. 1, 10 ed. (Laurentii Salvii: Holmiae (Stockholm)).
1767. *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species cum characteribus, differentiis, synonymis, locis. Editio duodecima, reformata*. Vol. 1 (part 2), 12 ed. (Laurentii Salvii: Holmiae [Stockholm]).
- Mammen, T.A. 1965a. On a collection of hydroids from South India. II. Suborder Thecata (excluding family Plumulariidae). *Journal of the Marine Biological Association of India* 7: 1-57.
- 1965b. On a collection of hydroids from South India. III. Family Plumulariidae. *Journal of the Marine Biological Association of India* 7: 291-324.
- Marktanner-Turneretscher, G. 1890. Die Hydroiden des k.k. naturhistorischen Hofmuseums. *Annalen des k.k. naturhistorischen Hofmuseums, Wien* 5: 195-286, pls 3-7.
- Marshall, W. 1892. Spongiologische Beiträge. Pp. 1-36, pls 1-8. In, *Festschrift zur siebenzigsten Wiederkehr des Geburtstages von Rudolf Leuckart*. (C.F. Winter: Leipzig).
- McCady, J. 1857. Gymnophthalmata of Charleston Harbor. *Proceedings of the Elliott Society of Natural History of Charleston, South Carolina* 1: 103-221, pls 8-12.
- Medel, M.D., García, F.G. & Vervoort, W. 1998. The family Haleciidae (Cnidaria: Hydrozoa) from the Strait of Gibraltar and nearby areas. *Zoologische Verhandlungen* 72: 29-50.
- Medel, M.D. & Vervoort, W. 1998. Atlantic Thyroscyphidae and Sertulariidae (Hydrozoa, Cnidaria) collected during the CANCAP and Mauritania-II expeditions of the National Museum of Natural History, Leiden, The Netherlands. *Zoologische Verhandlungen* 320: 1-85.

2000. Atlantic Haleciidae and Campanulariidae (Hydrozoa, Cnidaria) collected during the CAN-CAP and Mauritania-II expeditions of the National Museum of Natural History, Leiden, The Netherlands. *Zoologische Verhandelingen* 330: 1–68.
- Medel Soteras, M.D., García, F.J. & García-Gómez, J.C. 1991. La familia Sertulariidae (Cnidaria: Hydrozoa) en el Estrecho de Gibraltar y la Península Ibérica: aspectos taxonómicos y zoogeográficos. *Cahiers de Biologie Marine* 32: 503–543.
- Migotto, A.E. 1996. Benthic shallow-water hydroids (Cnidaria, Hydrozoa) of the coast of São Sebastião, Brazil, including a checklist of Brazilian hydroids. *Zoologische Verhandelingen* 306: 1–125.
- Migotto, A.E. & Cabral, A.S. 2005. *Lafoeina amirantensis* (Cnidaria: Hydrozoa, Campanulinoidea), the hydroid stage of the medusa *Cirrholovenia tetranema* (Cnidaria: Hydrozoa, Lovenelloidea). *Zootaxa* 919: 1–16.
- Millard, N.A.H. 1958. Hydrozoa from the coasts of Natal and Portuguese East Africa. I. Calyptoblastea. *Annals of the South African Museum* 44: 165–226.
1962. The Hydrozoa of the south and west coasts of South Africa. Part I. The Plumulariidae. *Annals of the South African Museum* 46: 261–319.
1966. The Hydrozoa of the south and west coasts of South Africa. Part III. The Gymnoblastea and small families of Calyptoblastea. *Annals of the South African Museum* 48: 427–487, pl 1.
1975. Monograph on the Hydroids of southern Africa. *Annals of the South African Museum* 68: 1–513.
- Millard, N.A.H. & Bouillon, J. 1973. Hydroids from the Seychelles (Coelenterata). *Annales du Musée royal de l'Afrique centrale, Série en-8°, Sciences Zoologiques* 206: 1–106, pls 1–5.
- Mulder, J.F. & Trebilcock, R.E. 1915. Victorian Hydroids. With description of new species. Part V. *Geelong Naturalist* 6: 51–59, pls 7–9.
- Norman, A.M. 1867. Report of the committee appointed for the purpose of exploring the coasts of the Hebrides by means of the dredge. Part II. On the Crustacea, Echinodermata, Polyzoa, Actinozoa, and Hydrozoa. *Report of the British Association for the Advancement of Science, Nottingham 1866* 36: 193–206.
- Nutting, C.C. 1896. Notes on Plymouth hydroids. *Journal of the Marine Biological Association of the United Kingdom* 4: 146–154.
1898. On three new species of hydroids and one new to Britain. *Annals and Magazine of Natural History (Series 7)* 1: 362–366, pls 14–16.
- Oken, L. 1815. *Oken's Lehrbuch der Naturgeschichte. Dritte Teil. Zoologie*. (Schmid: Jena).
- Peña Cantero, Á.L., García Carrascosa, A.M. & Vervoort, W. 1998. On the species of *Filellum* Hincks, 1868 (Cnidaria: Hydrozoa) with the description of a new species. *Journal of Natural History* 32: 297–315.
- Pennycuik, P.R. 1959. Faunistic records from Queensland. Part V. — Marine and brackish water hydroids. *University of Queensland Papers. Department of Zoology* 1: 141–210.
- Péron, F. & Lesueur, C.A. 1810. Tableau des caractères génériques et spécifiques de toutes les espèces de méduses connues jusqu'à ce jour. *Annales du Muséum national d'Histoire naturelle* 14: 325–366.
- Petersen, K.W. 1990. Evolution and taxonomy in capitate hydroids and medusae (Cnidaria: Hydrozoa). *Zoological Journal of the Linnean Society* 100: 101–231.
- Pictet, C. 1893. Étude sur les hydraires de la Baie d'Amboine. *Revue Suisse de Zoologie* 1: 1–64, pls 1–3.
- Preker, M. 1998. Hydroids. Pp. 170–172. In, Davie, P. et al., *Wild Guide to Moreton Bay*. (Queensland Museum: Brisbane).
2001. Hydroids from North East Cay, Herald Cays. Pp. 151–156. In, *Geography Monograph Series No. 6. Herald Cays Scientific Study Report*. (Royal Geographical Society of Queensland Inc.: Fortitude Valley).
2005. Notes on Hydrozoans from North West Island. *Queensland Naturalist* 43: 46–50.
- Preker, M. & Lawn, I. 2005. Hydroids (Hydrozoa: Leptolida) from the Wellesley Islands, Gulf of Carpentaria. Pp. 333–349. In, *Geography Monograph Series No. 10. Gulf of Carpentaria Scientific Study Report*. (Royal Geographical Society of Queensland Inc.: Milton).
- Ralph, P.M. 1953. A guide to the athecate (gymnoblasic) hydroids and medusae of New Zealand. *Tuatara* 5: 59–75.
1957. New Zealand thecate hydroids. Part I. — Campanulariidae and Campanulinidae. *Transactions of the Royal Society of New Zealand* 84: 811–854.
1958. New Zealand thecate hydroids. Part II. — Families Lafoeidae, Lineolariidae, Haleciidae, and Syntheciidae. *Transactions of the Royal Society of New Zealand* 85: 301–356.
- 1961a. New Zealand thecate hydroids. Part III. — Family Sertulariidae. *Transactions of the Royal Society of New Zealand* 88: 749–838.
- 1961b. New Zealand thecate hydroids. Part IV. — The Family Plumulariidae. *Transactions of the Royal Society of New Zealand, Zoology* 1: 19–74.

- 1961c. New Zealand thecate hydroids. Part V. – The distribution of the New Zealand thecate hydroids. *Transactions of the Royal Society of New Zealand, Zoology* 1: 103–111.
- Ramil, F. & Vervoort, W. 1992. Report on the Hydroida collected by the “BALGIM” expedition in and around the Strait of Gibraltar. *Zoologische Verhandelingen* 277: 1–262.
- Rees, W.J. 1939. A revision of the genus *Campanulina* van Beneden, 1847. *Annals and Magazine of Natural History* (Series 11) 3: 433–447.
- Rees, W.J. & Thursfield, S. 1965. The hydroid collections of James Ritchie. *Proceedings of the Royal Society of Edinburgh. Section B Biology* 69: 34–220.
- Rees, W.J. & Vervoort, W. 1987. Hydroids from the John Murray Expedition to the Indian Ocean, with revisory notes on *Hydrodendron*, *Abietinella*, *Cryptolaria* and *Zygophylax* (Cnidaria: Hydrozoa). *Zoologische Verhandelingen* 237: 1–209.
- Ritchie, J. 1907. On collections of the Cape Verde Islands marine fauna, made by Cyril Crossland, M.A. (Cantab.), B.Sc. (Lond.), F.Z.S., of St. Andrews University, July to September, 1904. – The hydroids. *Proceedings of the Zoological Society of London* 1907: 488–514, pls 23–26.
- 1910a. Hydroids from Christmas Island, Indian Ocean, collected by C.W. Andrews, D.Sc., F.R.S., F.Z.S., in 1908. *Proceedings of the Zoological Society of London* 1910: 826–836.
- 1910b. The marine fauna of the Mergui Archipelago, Lower Burma, collected by Jas. J. Simpson, M.A., B.Sc., and R.N. Rudmose-Brown, D.Sc., University of Aberdeen, February to May 1907. – The hydroids. *Proceedings of the Zoological Society of London* 1910: 799–825, pls 76–77.
1911. Hydrozoa (hydroid zoophytes and Stylasterina) of the “Thetis” Expedition. Pp. 805–869, pls 84–89. In, *Scientific results of the trawling expedition of H.M.C.S. “Thetis” off the coast of New South Wales in February and March, 1898*. Memoir IV. Part 16. (Australian Museum: Sydney).
- Russell, B.C. & Hewitt, C.L. 2000. Baseline Survey of the Port of Darwin for Introduced Marine Species. A report to the Northern Territory Department of Transport and Works. Northern Territory Government: i–v, 1–98.
- Russell, F.S. 1953. *The medusae of the British Isles. Anthomedusae, Leptomedusae, Limnomedusae, Trachymedusae and Narcomedusae*. (Cambridge University Press: Cambridge).
- Ryland, J.S. & Gibbons, M.J. 1991. Intertidal and shallow water hydroids from Fiji. II. Plumulariidae and Aglaopheniidae. *Memoirs of the Queensland Museum* 30: 525–560.
- Sars, G.O. 1874. Bidrag til Kundskaben om Norges Hydroider. *Forhandlinger i Videnskabs-Selskabet i Christiania* 1873: 91–150, pls 2–6.
- Schuchert, P. 1996. The marine fauna of New Zealand: Athecate hydroids and their medusae (Cnidaria: Hydrozoa). *New Zealand Oceanographic Institute Memoir* 106: 1–159.
1997. Review of the family Halopterididae (Hydrozoa, Cnidaria). *Zoologische Verhandelingen* 309: 1–162.
2001. Hydroids of Greenland and Iceland (Cnidaria, Hydrozoa). *Meddelelser om Grønland, Bioscience* 53: 1–184.
2003. Hydroids (Cnidaria, Hydrozoa) of the Danish expedition to the Kei Islands. *Steenstrupia* 27: 137–256.
2005. Taxonomic revision and systematic notes on some *Halecium* species (Cnidaria, Hydrozoa). *Journal of Natural History* 39: 607–639.
- Stechow, E. 1909a. Coelenterates. *Records of the Indian Museum* 3: 296–297.
- 1909b. Hydroidpolypen der japanischen Ostküste. I. Teil: Athecata und Plumularidae. Pp. 1–111, pls 1–7. In, Doflein, F. (Ed.), *Beiträge zur Naturgeschichte Ostasiens. Abhandlungen der mathematisch-physikalischen Klasse der Königlich Bayerischen Akademie der Wissenschaften*. Supplementbände I, Abhandlung 6. (K.B. Akademie der Wissenschaften: München).
1913. Hydroidpolypen der japanischen Ostküste. II. Teil: Campanularidae, Halecidae, Lafoeidae, Campanulinidae und Sertularidae, nebst Ergänzungen zu den Athecata und Plumularidae. Pp. 1–162. In, Doflein, F. (Ed.), *Beiträge zur Naturgeschichte Ostasiens. Abhandlungen der mathematisch-physikalischen Klasse der Königlich Bayerischen Akademie der Wissenschaften*. Supplementbände III, Abhandlung 2. (K.B. Akademie der Wissenschaften: München).
1919. Zur Kenntnis der Hydroidenfauna des Mittelmeeres, Amerikas und anderer Gebiete, nebst Angaben über einige Kirchenpauer'sche Typen von Plumulariden. *Zoologische Jahrbücher. Abteilung für Systematik* 42: 1–172.
1920. Neue Ergebnisse auf dem Gebiete der Hydroidenforschung. *Sitzungsberichte der Gesellschaft für Morphologie und Physiologie in München* 1919 31: 9–45.
1922. Zur Systematik der Hydrozoen, Stromatoporen, Siphonophoren, Anthozoen und Ctenophoren. *Archiv für Naturgeschichte (Abteilung A)* 88: 141–155.
- 1923a. Die Hydroidenfauna der Japanischen Region. *Journal of the College of Science, Imperial University of Tokyo* 44: 1–23.

- 1923b. Zur Kenntnis der Hydroidenfauna des Mittelmeeres, Amerikas und anderer Gebiete. II. Teil. *Zoologische Jahrbücher. Abteilung für Systematik* 47: 29–270.
1925. Hydroiden von West- und Südwestaustralien nach den Sammlungen von Prof. Dr. Michaelsen und Prof. Dr. Hartmeyer. *Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere* 50: 191–269.
- Stechow, E. & Müller, H.C. 1923. Hydroiden von den Aru-Inseln. *Abhandlungen Herausgegeben von der Senckenbergischen Naturforschenden Gesellschaft* 35: 459–478, pl 27.
- Stephenson, T.A., Stephenson, A., Tandy, G. & Spender, M. 1931. The structure and ecology of Low Isles and other reefs. Pp. 17–112, pls 1–27. In, *Great Barrier Reef Expedition 1928–29. Scientific Reports*. Vol. 3(2). (British Museum: London).
- Thornely, L.R. 1899. The hydroid zoophytes collected by Dr Willey in the southern seas. Pp. 451–457, pl 44. In, Willey, A. (Ed.), *Zoological results based on material from New Britain, New Guinea, Loyalty Islands and elsewhere: collected during the years 1895, 1896 and 1897*. (Cambridge University Press: Cambridge).
1904. Report on the Hydroida collected by Professor Herdman, at Ceylon in 1902. Pp. 107–126, pls 1–3. In, Herdman, W.A. (Ed.), *Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar. Part II. Supplementary Reports, No. VIII*. (The Royal Society: London).
- Torrey, H.B. 1902. The Hydroida of the Pacific coast of North America. *University of California Publications in Zoology* 1: 1–104, pls 1–11.
- Trebilcock, R.E. 1928. Notes on New Zealand Hydroida. *Proceedings of the Royal Society of Victoria (New Series)* 41: 1–31, pls 1–7.
- Vervoort, W. 1941. The Hydroida of the Snellius Expedition (Milleporidae and Stylasteridae excluded). Biological results of the Snellius Expedition. XI. *Tenisoniuckia* 6: 186–240.
1959. The Hydroida of the tropical west coast of Africa. Scientific results of the Danish Expedition to the coasts of tropical west Africa, 1945–1946. *Atlantide Report* 5: 211–325.
1962. A redescription of *Solanderia gracilis* Duchassaing & Michelin, 1846, and general notes on the family Solanderiidae (Coelenterata: Hydrozoa). *Bulletin of Marine Science of the Gulf and Caribbean* 12: 508–542.
1966. Skeletal structure in the Solanderiidae and its bearing on hydroid classification. *Symposia of the Zoological Society of London* 16: 373–396.
1968. Report on a collection of Hydroida from the Caribbean region, including an annotated checklist of Caribbean hydroids. *Zoologische Verhandlungen* 92: 1–124.
1993. Cnidaria, Hydrozoa, Hydroida: Hydroids from the Western Pacific (Philippines, Indonesia and New Caledonia). I: Sertulariidae (Part 1). In, Crosnier, A. (Ed.), *Résultats des Campagnes MUSORSTOM. Volume 11. Mémoires du Muséum national d'Histoire naturelle* 158: 89–298.
- Vervoort, W. & Vasseur, P. 1977. Hydroids from French Polynesia with notes on distribution and ecology. *Zoologische Verhandlungen* 159: 1–98.
- Vervoort, W. & Watson, J.E. 2003. The marine fauna of New Zealand: Leptothecata (Cnidaria: Hydrozoa) (thecate hydroids). *NIWA Biodiversity Memoir* 119: 1–538.
- Von Lendenfeld, R. 1885a. Addenda to the Australian Hydromedusae. *Proceedings of the Linnean Society of New South Wales* 9: 908–924, 984–985, pls 40–43.
- 1885b. The Australian Hydromedusae. *Proceedings of the Linnean Society of New South Wales* 9: 206–241, 345–353, 401–420, 467–492, 581–634, pls 6–8, 12–17, 20–29.
- Warren, E. 1908. On a collection of hydroids, mostly from the Natal coast. *Annals of the Natal Government Museum* 1: 269–355, pls 45–48.
- Watson, J.E. 1973. Pearson Island Expedition, 1969 – 9. Hydroids. *Transactions of the Royal Society of South Australia* 97: 153–200.
1979. Biota of a temperate shallow water reef. *Proceedings of the Linnean Society of New South Wales* 103: 227–235.
1985. The genus *Eudendrium* (Hydrozoa: Hydroida) from Australia. *Proceedings of the Royal Society of Victoria* 97: 179–221.
- 1994a. New records and redescrptions of the thecate hydroids from southern Australia. *Proceedings of the Royal Society of Victoria* 106: 147–162.
- 1994b. Shallow water hydroids from eastern Bass Strait. *Victorian Naturalist* 111: 65–69.
1996. Distribution and biogeographic relationships of the hydroid fauna of the Australian west coast: a preliminary account. In, Piraino, S., Boero, F., Bouillon, J., Cornelius, P.F.S. & Gili, J.-M. (Eds), *Advances in hydrozoan biology. Scientia Marina* 60: 75–83.
1997. The hydroid fauna of the Houtman Abrolhos Islands, Western Australia. Pp. 503–546. In, Wells, F.E. (Ed.), *Proceedings of the Seventh International Marine Biological Workshop. The marine flora and*

- fauna of the Houtman Abrolhos Islands, Western Australia*. (Western Australian Museum: Perth).
1999. Hydroids (Hydrozoa: Anthoathecata) from the Beagle Gulf and Darwin Harbour, northern Australia. *The Beagle, Records of the Museums and Art Galleries of the Northern Territory* **15**: 1–21.
2000. Hydroids (Hydrozoa: Leptothecatae) from the Beagle Gulf and Darwin Harbour, northern Australia. *The Beagle, Records of the Museums and Art Galleries of the Northern Territory* **16**: 1–82.
2002. Hydroids (Cnidaria: Hydrozoa) from southern Queensland. *Memoirs of the Museum of Victoria* **59**: 337–354.
2003. Encounter 2002 expedition to the Isles of St Francis, South Australia: Annotated list of shallow water hydroids with description of a new species of *Campanularia*. *Transactions of the Royal Society of South Australia* **127**: 243–263.
2005. Hydroids of the Archipelago of the Recherche and Esperance, Western Australia: annotated list, redescription of species and description of new species. Pp. 495–611. In, Wells, F.E., Walker, D.I. & Kendrick, G.A. (Eds), *The marine flora and fauna of Esperance, Western Australia*. (Western Australian Museum: Perth).
- Weill, R. 1934. Contribution à l'étude des cnidaires et de leurs nématocystes. II. Valeur taxonomique du cnidome. *Travaux de la station Zoologique de Wimereux* **11**: 347–701.
- Weismann, A. 1883. Die Entstehung der Sexualzellen bei den Hydromedusen. Zugleich ein Beitrag zur Kenntniss des Baues und der Lebenserscheinungen dieser Gruppe. (Verlag August Fischer: Jena).
- Weltner, W. 1900. Hydroiden von Amboina und Thursday Islands. In, Semon, R. (Ed.), *Zoologische Forschungsreisen in Australien und dem Malayischen Archipel*, 5. Denkschriften der medizinisch naturwissenschaftlichen Gesellschaft von Jena **8**: 583–590, pl 46.
- Whitelegge, T. 1889. List of the marine and fresh-water invertebrate fauna of Port Jackson. *Journal of the Proceedings of the Royal Society of New South Wales* **23**: 163–323.
- Wineera, J.S. 1968. The histology of a species of *Solanderia* Duchassaing & Michelin, 1846 from Auckland Harbour, New Zealand, with special reference to the internal skeleton of the Solanderiidae (Coelenterata, Hydrozoa). *Zoology Publications from Victoria University of Wellington* **43**: 1–11.
- Yamada, M. & Kubota, S. 1987. Preliminary report on the marine hydroid fauna in Okinawa Islands. *Galaxea* **6**: 35–42.